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USMC Integrated Logistics Capability Proof of Concept: Mid-Term Assessment

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Summary

The Director, Integrated Logistics Capability (ILC) Center, asked CNA to provide analytic support for the proof of concept (POC) demonstration of selected ILC initiatives at 2d Force Service Support Group (FSSG). Specifically, we were asked to develop and execute a data collection and analysis plan, including performance measures, to track the progress of the POC, looking at both supply and maintenance activities.

The ILC Proof of Concept Plan includes several hypotheses regarding the desired effects of implementing two ILC initiatives: 2nd echelon of maintenance (EOM) migration and consolidation of supply functions (CSF) at the intermediate level. For each of these hypotheses we identified one or more performance measures and data sources for these measures. These measures can be divided into two categories: operational/risk (effectiveness) measures and internal performance (efficiency) measures.

The first step in testing these hypotheses was to collect and assess the state of these performance measures before the POC began. A previous report provided this baseline assessment for the POC [1]. This document uses that baseline information in conjunction with data collected on the same measures throughout the POC to test the validity of these hypotheses at the midterm point of the POC. This document discusses changes since that baseline assessment and contains three main sections:

- An overview of the methodology used to develop the data collection and analysis plan
- A comparison of changes between the baseline data and midterm data for logistics operations, including information on quantitative data gathered from automated systems (readiness, repair cycle time, and supply response time) and quantitative and qualitative data from surveys

- Appendices containing more detailed information on survey data and other background information.

This report is not a comprehensive report on all of the changes that have occurred throughout the POC.[1] Instead, it focuses on trends in the main performance measures included in the baseline assessment.

Some general observations on these performance measures at the midterm point of the POC include the following:

- **Materiel readiness rates:** Readiness rates stayed fairly constant for all except Delta TAMCNs, which show a marked drop in readiness through Fall 2001. Alpha and Echo TAMCNs tend to have higher readiness rates than Bravo and Delta TAMCNs during both the baseline and POC periods. Alpha and Echo TAMCN readiness rates range from 84 percent to 98 percent; Bravo TAMCNs from 78 percent to 89 percent; Delta TAMCNs from 61 percent to 73 percent, down from 75.5 percent to 90.4 percent during the baseline period. However, this decrease in readiness during the initial part of the POC appears to be a temporary phenomenon, as Delta TAMCN readiness rates have been increasing in recent months.

- **Repair cycle time:** When we compare the baseline and POC RCT, across all priorities, TAMCNs and types of maintenance, there tends to be a slight decrease in median RCT during the POC, with an overall median RCT of 14 days in April 2002. The variability of RCT is also decreasing - 95 percent of repair tasks were completed in fewer than 134 days in April 2002, down from 214 days in April 2001. This is a fairly dramatic drop from October 2001, when the 95th percentile was 248 days. The decrease in variability is just as important as the median RCT. If operators know that they will always receive their equipment in a certain number of days, they can plan accordingly. Decreases in variability of RCTs are likely partially due to decreases in supply response time for mechanics waiting for parts.

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1. For a timeline of events at 2d FSSG, see appendix C. This timeline shows the vast number of events occurring during this time period, many of which were not directly related to ILC concepts.

- **Number of repair tasks:** Another change during the POC has been the large increase in the number of tasks performed by 2d FSSG personnel. For example, the number of tasks closed in October 2001 was 234 percent higher than in October 2000. This increase is due to several factors. In some cases, maintenance personnel are working longer hours than they did during the baseline period. In addition, the 'bumper-to-bumper' maintenance policy means that more tasks may be opened on individual pieces of equipment than in the past because maintenance personnel are performing more thorough inspections.

- **Supply response time:** The median supply response time has decreased in recent months.[2] Median SRT, across all priorities, TAMCNs, and types of maintenance, during the POC ranged from 1 to 8 days, a substantial decrease from the baseline period (where the median ranged from 8 to 22 days). Bravo and Delta TAMCNs drove this decrease in median SRT, while SRTs for Alpha and Echo TAMCNs stayed approximately the same.

- We also see a drastic reduction in the variability of supply response time during the last few months as compared to the baseline period. The 95th percentile in October 2000 was 91 days, while in October 2001 the 95th percentile was 50 days and in March 2002, 47 days. One possible factor in these reductions in variability and SRT is the new policy for the ISSA to deliver supplies to units twice a day, rather than only once.

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2. In previous data, supply response time was called customer wait time. The data presented here is the same—the time it takes for a mechanic to receive a repair part—but we have changed the name of the measure to prevent confusion with overall customer wait time (the time it takes for an operator to receive their equipment back in working order). Here, we define SRT as the time from the date the item was ordered to the date on which the corresponding local status code was assigned—this code is assigned when the item is received by the local supply organization.

- **Time allocation (maintenance):** While there does not seem to be much of a change for maintenance personnel as a whole, junior enlisted Marines (PVT through CPL) reported spending more time on maintenance-related functions at the midterm point than during the baseline period (about one-third of their time at work compared to about one-fourth of their time). This result, while an improvement, still shows that much of a maintenance Marine's time is spent on functions other than maintenance.

- **Training quality for maintenance personnel:** for a majority of maintenance Military Occupational Specialties (MOS), more Marines are working on duties within their MOS than were before the POC. In addition, in many cases, confidence in performing ITSs (Individual Training Standards) within individual MOSs has increased.

- **Time allocation (supply):** At this point in the POC, the total amount of time spent by supply personnel on supply activities remains between 45 percent and 55 percent of their time at work. However, the amount of time spent on warehouse activities increased substantially, compared to the baseline, while the amount of time spent on property control decreased.

- **'Quality':** Measuring the 'quality' of logistics support is difficult, since 'quality' is inherently a subjective issue. However, as an attempt to measure the 'quality' of logistics support, we surveyed 2d FSSG personnel about their satisfaction with maintenance and supply support. 'Customers'—supervisors in the FSSG who receive supply and maintenance support - reported much lower levels of satisfaction with the support they are receiving during the POC than they did during the baseline period. The percentage of respondents rating overall quality of maintenance support either poor or fair rose to 46%, compared to 22% in the baseline. At the same time, the percentage rating overall support either good or excellent dropped to 16% from 46%. All three elements of maintenance support that we asked about (responsiveness to requirements, timeliness of repair, and resolution of service complaints) showed similar increases in dissatisfaction.

- There are issues that fall outside the scope of ILC that may potentially influence the success or failure of ILC. These issues must be taken into account when assessing the impact of ILC.

Introduction

The Director, Integrated Logistics Capability (ILC) Center, asked CNA to provide analytic support for the proof of concept demonstration of the ILC initiatives. Specifically, we were asked to develop and execute a data collection and analysis plan, including performance measures, to track supply and maintenance activities. We were also asked to coordinate data collection efforts between the Field Supply Maintenance Analysis Office (FSMAO-1), Logistics Studies and Analysis (LX), and CNA.

We intend this document to compliment the original data collection plan outlined in Appendix B of the ILC Center Proof of Concept Plan and the proof of concept baseline assessment report. This document compares data collected during the proof of concept with the baseline data collected during April and May 2001.[3] While the POC is still underway, we can gauge the initial impact of ILC concepts on logistics support.

3. A 'quick look' assessment in February 2002 provided an snapshot of the progress of the proof of concept to that point. [2] This report extends that analysis.

Background

The ILC program began in 1998 as a unique collection of military, private and academic organizations. The purpose of the collaboration was to develop a future vision of Marine Corps logistics process, in particular, the supply and maintenance functions. The product was a set of initiatives that will provide better support to the warfighter while realizing structural efficiencies. The Assistant Commandant of the Marine Corps approved the initiatives in 1999 and the ILC Center was established later the same year. Today, the ILC Center serves as the focal point for ILC activities.

Proof of Concept background

In late March 2001, the ILC Center began plans for an extensive proof of concept demonstration at 2d Force Service Support Group (FSSG), II Marine Expeditionary Force (MEF) near Jacksonville, NC. This POC focused on two of the ILC initiatives:

- Consolidation of supply functions: Selected supply functions will be removed from the units and consolidated at the intermediate level within the FSSG
- 2nd/3rd EOM consolidation: Maintenance functions will be consolidated at the intermediate level within the FSSG.

In early April, the Commanding General, 2d FSSG directed the realignment of major supply and maintenance functions within 2d FSSG. This realignment started with five of the seven battalions within 2d FSSG - Headquarters and Service (HQSVC); Maintenance; Supply; Medical, and Dental. The remaining two battalions - Transportation Support Battalion (TSB) and Engineering Support Battalion (ESB) - followed in the summer of 2001.

This document focuses on assessing this proof of concept, rather than the entire ILC program.[4]

Methodology

During the planning process for the proof of concept, the ILC Center and 2nd FSSG Integrated Process Team (IPT) translated the program objectives to proof of concept objectives. Next, we developed baseline assessment objectives from the IPT proof of concept plan. From the baseline assessment objectives, we developed a set of performance measures. These measures compliment those originally developed by the IPT. Next, we identified sources of required data elements. We have collected data for this set of performance measures throughout the proof of concept.

Performance measures for the proof of concept

The ILC Proof of Concept Plan includes several hypotheses regarding the desired effects of implementing two ILC initiatives: 2nd echelon of maintenance migration and consolidation of supply functions at the intermediate level. For each of these hypotheses we identified one or more performance measures. Many of the performance measures relate to multiple hypotheses. (The full list can be found in appendix B.)

These measures can be divided into two categories: operational/risk measures and internal performance measures. Operational/risk measures identify changes in the effectiveness of the logistics systems, while internal performance measures identify efficiencies. The focus of ILC is on improving the effectiveness of logistics systems, but we are also interested in capturing efficiency gains.

Operational/Risk (effectiveness) measures

Using the hypotheses in the ILC POC plan as a guide, we determined a set of performance measures to analyze changes in effectiveness. The primary measures are:

- Materiel readiness rates
- Repair cycle time

4. For a summary of the ILC concept as a whole, see [1].

- Supply response time
- Man-hours per function
- Quality of training for maintenance personnel
- Number of maintenance and supply personnel
- Customer satisfaction

Internal performance (efficiency) measures

Again, using the hypotheses in the ILC POC plan as a guide, we determined a set of performance measures to analyze changes in efficiency. The primary measures are:

- Inventory value
- Number of toolsets/chests/kits
- Square feet of facilities
- Number of hazardous materiel (HAZMAT) sites

With the exception of inventory value, the measures listed above do not directly address costs, due to the present limitations of existing cost data. However, we will be able to estimate cost savings due to personnel realignment, changes in facilities, changes in toolsets/chests/kits, and other costs using these measures.

Data collection

Once we identified these measures, we determined methods to collect the information. There are three main sources of data:

- Automated data sources (ATLASSII+ (Asset Tracking Logistics and Supply System II+) and MCREM (Marine Corps Readiness Equipment Module))
- Quantitative information from surveys administered to 2d FSSG personnel, including operators, maintenance personnel, and supply personnel.

- Qualitative information from surveys administered to 2d FSSG personnel and from observation and interviews by CNA analysts and FSMAO.

Accurate baseline data is vital in assessing the impact of ILC concepts. The baseline data collection in this case did not take place in an ideal environment, since some organizational and functional changes occurred before the data collection could be completed. The very short timeframe in which the data collection occurred should be taken into account in this report and in future assessments.

Timeline

For purposes of this analysis, the baseline period is October 2000 - April 2001. We consider May - September 2001 as a transition period to the POC. The vast number of changes occurring during this period, particularly on the maintenance side, mean that the data may not necessarily reflect either the pre-POC processes or the POC processes. However, by October 2001, much of the new maintenance structure was in place and so we consider that as the beginning of the analysis period for the POC. Data in this report runs through April or May 2002, depending on the performance measure.

Contents of this assessment

This document does not compare progress on all of the performance measures listed above. Some measures - such as the set of efficiency measures (inventory value, number of toolsets/chests/kits, square feet of facilities, and number of hazardous materiel (HAZMAT) sites) - will not be compared until the POC has finished and 2d FSSG is in the final configuration. Other measures - such as materiel readiness, repair cycle time, and supply response time - can be tracked as the POC progresses. Still other measures (maintenance and supply time allocation and customer satisfaction) are periodically surveyed. The latter two groups are the measures we focus on here.

The POC plan lists the hypotheses to be tested. At this point, we cannot say whether these desired outcomes will in fact occur. Most of these are long-term issues. We can say that, for example, maintenance personnel have been moved with 2nd and 3rd echelon maintenance

performed in centralized locations. We cannot say yet whether this move will result in better trained mechanics in the long run.

It is too soon to provide any kind of comprehensive analysis of the ILC proof of concept. With the bulk of the implementation occurring in the summer of 2001, units have only been operating under ILC concepts for a few months. Analyzing the progress of the ILC proof of concept is made more difficult by the other events that are occurring simultaneously with the POC. Combat Service Support migration, for example, has been taking place along with the ILC proof of concept. It is nearly impossible to say with certainty whether results are due to ILC implementation, CSS migration, or some other change in operating procedures.

Measuring the progress of the proof of concept

Most of the early focus of the proof of concept was on maintenance issues. Implementation of the consolidation of supply functions began in the winter of 2001. However, process re-engineering is still in the beginning stages. Given that ILC is focused on process re-engineering rather than physical consolidation of assets, it is still very early to draw any conclusions about the effectiveness of ILC concepts.

Appendix C provides a list of some of the major milestones during the POC. Not all of these milestones are related to ILC concepts - many are a part of Combat Service Support migration. It is important to keep in mind that, since the ILC POC and CSS migration have been implemented at the same time, it is difficult to sort out the effect of one initiative from that of the other. Changes in performance indicators may be due to ILC, CSS migration, or some combination of both.

With this caveat in mind, in the following sections, we present information comparing the baseline data with data from October 2001 to April/May 2002 for maintenance and supply systems from several perspectives:

- Quantitative statistics on materiel readiness, repair cycle time and supply response time.
- Comparison of time allocation for maintenance and supply personnel and training quality for maintenance personnel
- Qualitative data on current perceptions and issues regarding the quality of maintenance and supply support

All three of these kinds of data are important in understanding the effects of implementing ILC concepts. Materiel readiness rates, RCT, and SRT show only the end result of how the maintenance and supply systems are working. To understand the factors behind this data and assist in reform efforts, we look at the combination of quantitative and qualitative data.

Materiel readiness rates, repair cycle time, and supply response time

We present data for the several months prior to the beginning of the proof of concept to serve as a baseline for comparison purposes. The three primary measures that we extract from the automated information systems are materiel readiness rates, repair cycle time (RCT), and supply response time (SRT). We present monthly data for all three measures.

Materiel readiness rates

Summary of baseline data

There were a few trends evident in the baseline data for materiel readiness rates. Alpha and Echo TAMCNs (Table of Authorized Materiel Control Numbers) tended to have higher readiness rates than Bravo and Delta TAMCNs for the entire year. Alpha and Echo TAMCN readiness rates ranged from 87.9 percent to 98 percent; Bravo TAMCNs from 84.1 percent to 90.1 percent; Delta TAMCNs from 75.5 percent to 90.4 percent. There was a pronounced decrease in readiness for Delta TAMCNs between November 2000 and January 2001, but rates recovered as the year progressed.

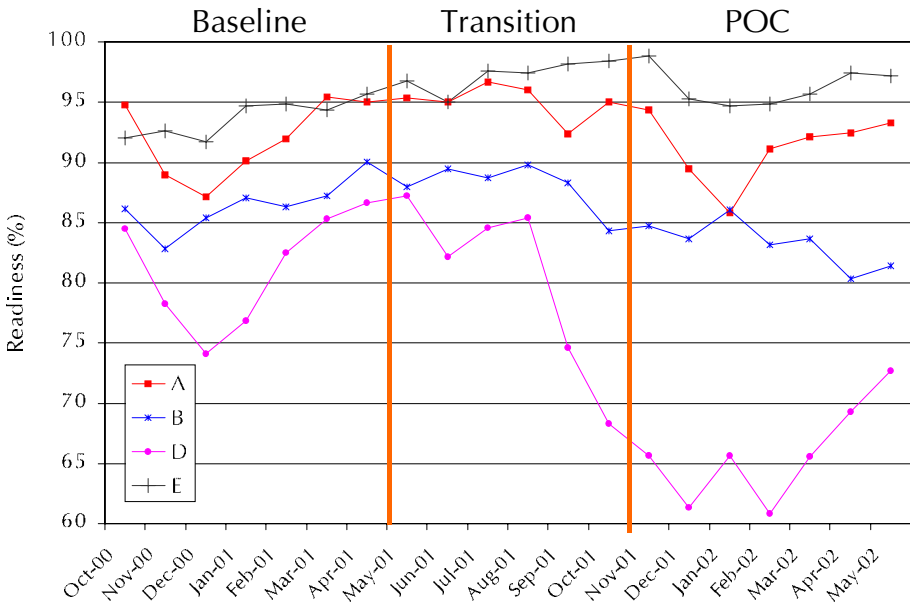
Proof of concept data

Readiness rates stayed fairly constant for all except Delta TAMCNs, which show a marked drop in readiness through Fall 2001. Figure 1 shows the monthly average materiel readiness rates from October 2000 to May 2002, separated by TAMCN (A, B, D, and E), for 2d FSSG. This data is taken from MCREM.

Alpha and Echo TAMCNs tend to have higher readiness rates than Bravo and Delta TAMCNs during both the baseline and POC periods. Alpha and Echo TAMCN readiness rates range from 84 percent to 98

percent; Bravo TAMCNs from 78 percent to 89 percent; Delta TAMCNs from 61 percent to 73 percent. There is a pronounced decrease in readiness for Delta TAMCNs between November 2000 and January 2001, but rates recovered as the year progressed.

Figure 1. Materiel Readiness Rates, 2d FSSG, by TAMCN, October 2000- May 2002



Delta TAMCNs

Data for the past five years shows that there tends to be a drop in the Fall in readiness of Delta TAMCNs, but this year the decrease in readiness has been even more marked.

One possible reason for this drop is the implementation of 'bumper-to-bumper' maintenance. As ILC concepts began to be implemented, 2d Maintenance Battalion performed more thorough inspections on the backlog of equipment, which may have uncovered defects that

should have been repaired in previous months. The increase in deadlined equipment results in lower readiness ratings. However, these low readiness levels may be only a temporary phenomenon. As we track readiness rates throughout the POC, after the backlog of maintenance is reduced, we would hope to see readiness return to higher levels. In fact, by the end of March 2002, it appeared that Delta TAMCN readiness was rebounding, but we will have to continue to follow the data to see whether this trend continues.

Repair Cycle Time

Throughout the POC, we have been tracking repair cycle time (RCT) for maintenance tasks. RCT is an important performance measure in terms of testing several of the hypotheses listed above. We calculate RCT by individual task, rather than by work order number (WON). This method provides a more accurate picture of the length of time it takes to perform individual repairs than calculating by WON because WONs remain open as long as any of the tasks on that WON are still open. Since tasks can be added at any time, an individual WON can be open for extremely long periods of time even after the original repair tasks are completed.

To compare the baseline period with data collected during the POC, the following charts compare October 2000 with October 2001, and November 2000 with November 2001, and so forth.

The data is divided three ways: by priority (03, 06, and 13); by TAMCN category (A, B, D, and E); and by type of maintenance (preventive, corrective, calibration, modification, inspection, and SL-3).

The charts describing RCT show the average (mean), median (50th percentile), 75th and 95th percentiles - so the top of the red bar is the median for the data. With the number of outliers in the data, the median gives us a better picture of current RCT than the average. (This is because the average is influenced heavily by these outliers. The median, on the other hand, is the point at which there are an equal number of data points above and below that point. Therefore a few tasks with extremely long RCT may skew the average, but will not affect the median.) As an example, in figure 2, the median RCT

for October 2000 is 13 days - so half of all repairs were completed in 13 or fewer days. For the same month, 75 percent of repairs were completed in 41 or fewer days, and 95 percent of repairs were completed in 130 or fewer days.

One thing to be aware of is that some of these categories contain very few observations - particularly the priority 03 repairs. With a very small sample size, one or two tasks that took an extraordinarily long or short time can skew the data so that it does not represent an accurate picture of the time it takes to perform most repair tasks in that particular category.

Overall RCT

Recap of baseline data

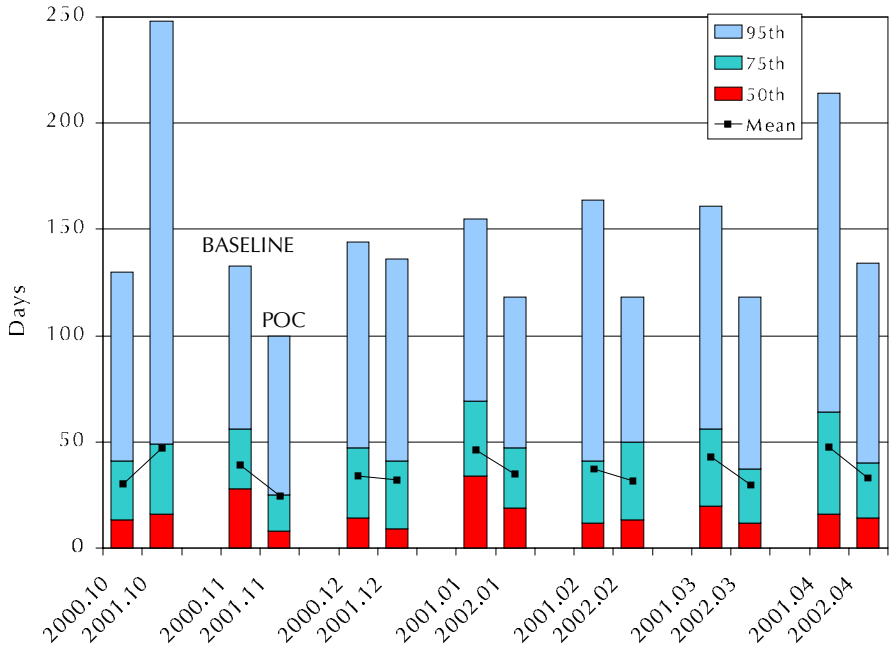
During the baseline period, the overall median repair cycle time (RCT), across all priorities, TAMCNs and types of maintenance, ranged from 12 days to 34 days. As the baseline period progressed, we saw an increase in the length of the distribution of RCT over time. The 95th percentile was 130 days in October 2000, peaked at 164 days in February 2001, and dropped slightly to 161 days in March 2001.

An increase in the 95th percentile tells us is that, over this period, there is an increasing percentage of repair tasks that, per task, take longer to complete. For example, there were 77 tasks (5 percent of 1486 total tasks) that took longer than 130 days to complete in October 2000. In comparison, there were 243 tasks (18 percent of 1361 total tasks) that took longer than 130 days to complete in March 2001.

Comparison with POC data

When we compare the baseline and POC RCT, there tends to be a slight decrease in median RCT during the POC, with an overall median RCT of 14 days in April 2002. The variability of RCT is also decreasing - 95 percent of repair tasks were completed in fewer than 134 days in April 2002, down from 214 days in April 2001. This is a fairly dramatic drop from October 2001, when the 95th percentile was 248 days. (See figure 2.)

Figure 2. Repair Cycle Time (TAMCN = A, B, D, and E, priority 03, 06, and 13)



RCT by TAMCN

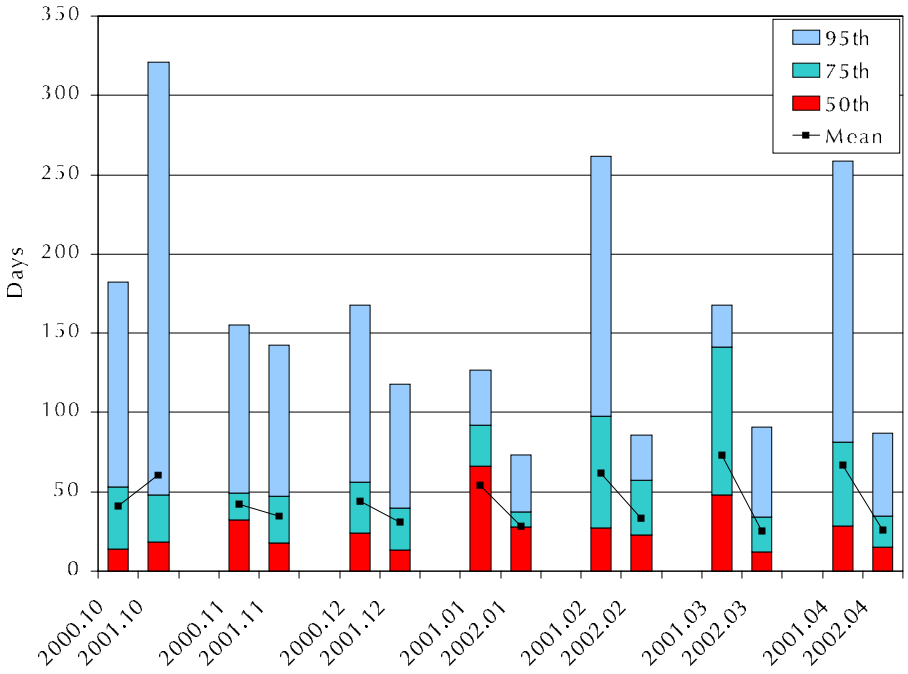
Overall RCT can mask trends that are evident when we break the data into smaller categories. We focus on Alpha, Bravo, Delta, and Echo TAMCNs in this analysis. The distribution of tasks across these four categories changed slightly from the baseline period, with a higher proportion of Delta TAMCN tasks (43 percent in the POC, compared to 31 percent in the baseline) and a lower proportion of Echo TAMCN tasks (23 percent of tasks during the POC compared to 38 percent in the baseline).

When we break the data down by TAMCN category, in April 2002, median RCT for Alpha TAMCNs was 15 days; 115 days for Bravo TAMCNs; 14 days for Delta TAMCNs; and 7 days for Echo TAMCNs.

We also see a substantial decrease in the 95th percentile starting in January 2002, when the data is separated by TAMCN, but as with over-

all RCT, in most cases this decrease simply brought the 95th percentile down to previous (Fall 2000) levels. The exception is Alpha TAMCNs, where the 95th percentile in February 2002 was 85 days, down from 262 days in February 2001.(See figures 3, 4, 5, and 6.)

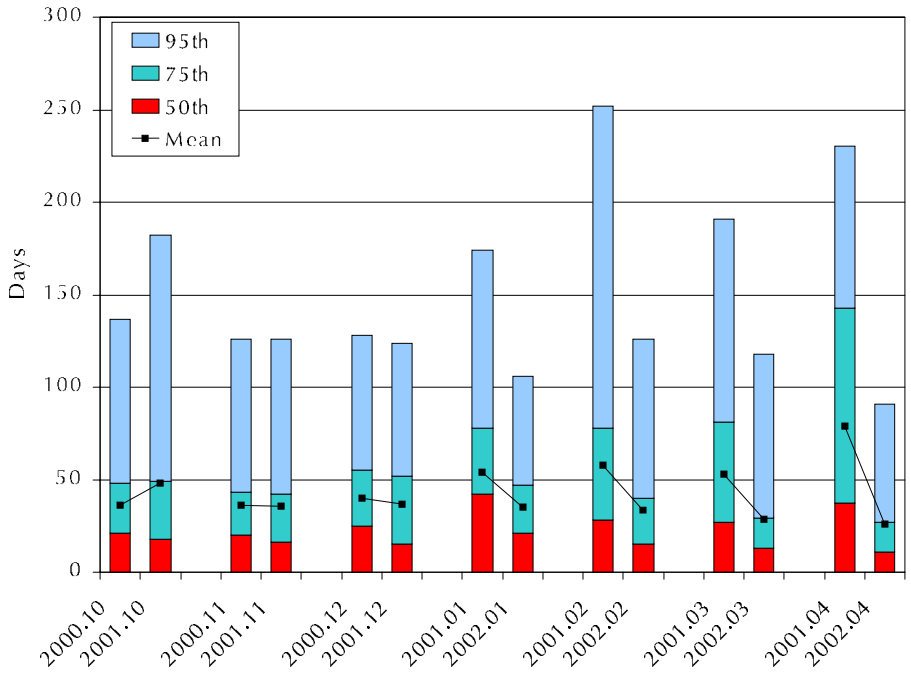
Figure 3. Repair Cycle Time (TAMCN = A)



The decrease in variability is just as important as the median RCT. If operators know that they will always receive their equipment in a certain number of days, they can plan accordingly. Decreases in variability of RCTs are likely partially due to decreases in supply response time for mechanics waiting for parts.

Another change during the POC has been the large increase in the number of tasks performed by 2d FSSG personnel. (See figure 7.) For example, the number of tasks closed in October 2001 was 234 percent

Figure 4. Repair Cycle Time (TAMCN = B)

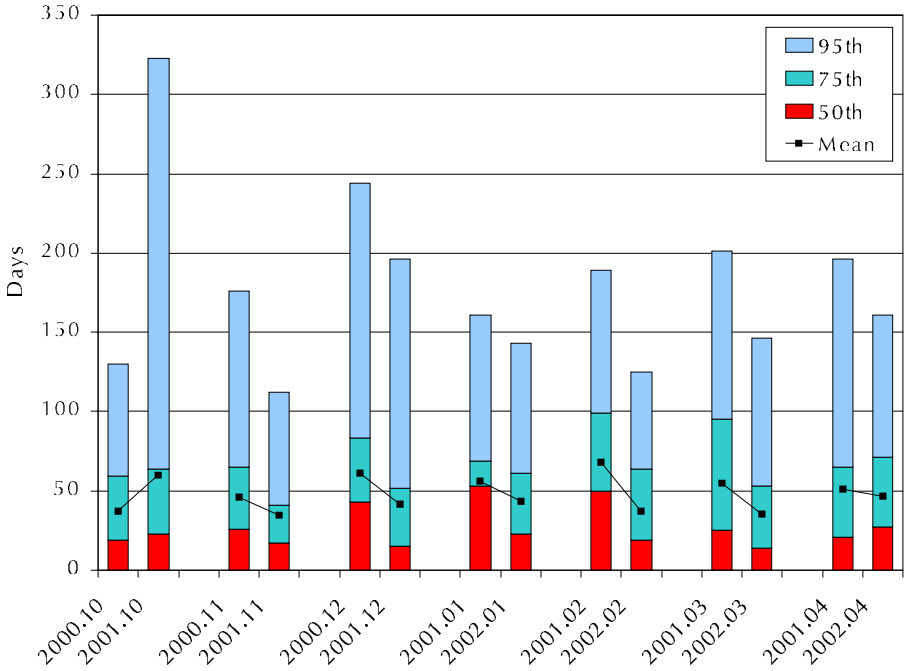


higher than in October 2000. This increase is due to several factors. In some cases, maintenance personnel are working longer hours than they did during the baseline period. In addition, the 'bumper-to-bumper' maintenance policy means that more tasks may be opened on individual pieces of equipment than in the past because maintenance personnel are performing more thorough inspections.

RCT by priority

During the POC, we have seen the distribution of tasks by priority change substantially. Many more tasks are designated priority 03 or 06 than in the baseline period. During the baseline, there were very few tasks in the priority 03 category - only 1.3 percent of the tasks from October 2000 - March 2001. In contrast, during October 2001 - March 2002, about 7 percent of tasks were designated priority 03. The distribution changed for priority 06 tasks as well - going from 23.4 percent of tasks in the baseline to 53 percent during the POC. These changes

Figure 5. Repair Cycle Time (TAMCN = D)



would indicate that the 'bumper-to-bumper' maintenance policy may be uncovering defects that should have been repaired earlier but were not. As the POC progresses, we will watch whether the distribution across priorities returns to previous levels or not. (See figures 8, 9, and 10 for RCT by priority.)

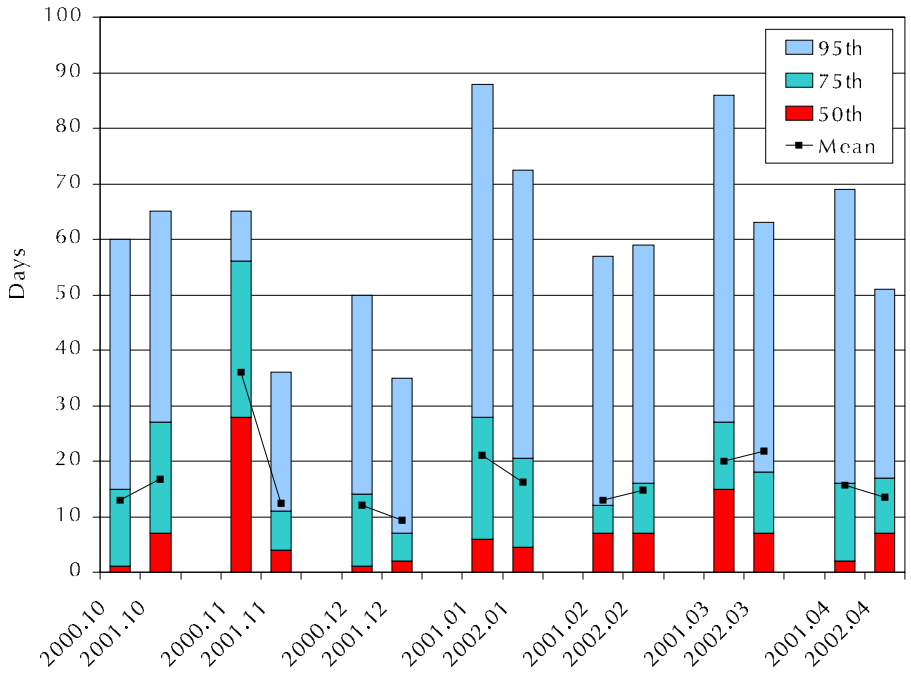
RCT by type of maintenance

Preventive maintenance

Figure 11 shows the data for preventive maintenance tasks. We see no particular trends in the repair cycle time for preventive maintenance tasks at this point. However, the number of preventive maintenance tasks has increased substantially in the last few months.

In November 2001, 2d FSSG implemented a new type of preventive maintenance inspections for certain Delta TAMCNs. The new process

Figure 6. Repair Cycle Time (TAMCN = E)



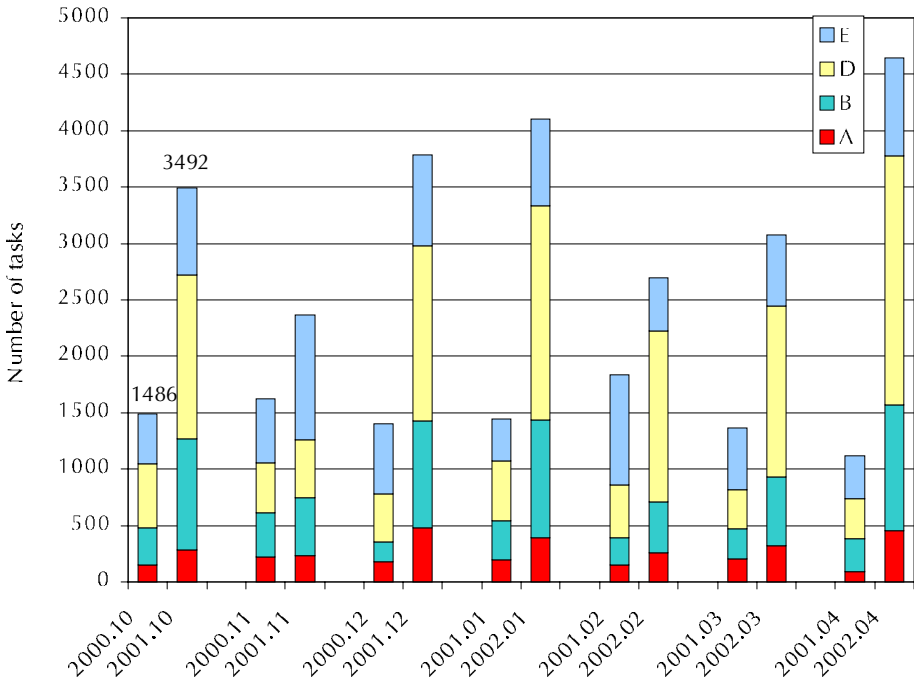
is intended to eliminate unnecessary replacement of parts and allow mechanics to perform these inspections more quickly. At this point, we cannot tell what the long-term effects of these new inspections on RCT, parts costs and man-hours required per inspection will be.[5]

Corrective maintenance

Figure 12 shows repair cycle time for corrective maintenance tasks. Median RCT during the proof of concept ranges from 10 – 23 days, down from 21 – 50 days in the baseline period. At the same time, the number of corrective maintenance tasks has increased substantially. As compared to the baseline period, the variability fell substantially in the November 2001 – March 2002 time period, with the 95th percentile falling to 111 days in March 2002.

5. This issue will be analyzed in the coming months.

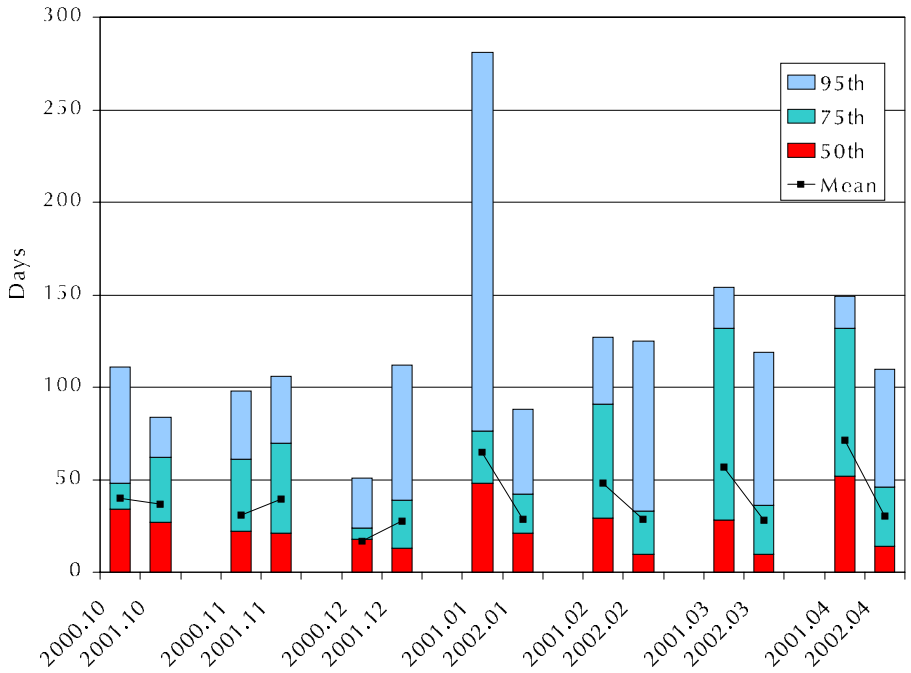
Figure 7. Number of tasks, by TAMCN



One reason for the lowered median RCT may be due to the increase in priority 06 tasks, relative to priority 13 tasks. Completion of priority 06 tasks may be prioritized over completion of priority 13 tasks, thereby lowering overall RCT. Another reason could be the long hours worked by 2d Maintenance Battalion personnel, particularly during the 'maintenance surge' in October 2001. With more total maintenance hours per day, tasks may have been able to be completed in a shorter time period than they would have with fewer man-hours per day.

Finally, yet another reason for the reduced median RCT may be fewer redundant inspections, as a result of the consolidation of 2nd and 3rd echelons of maintenance at 2d Maintenance Battalion. This final reason would be what implementing ILC concepts is designed to do. We will be able to tell if this reason is an important factor in reduced RCT after we see more data in upcoming months.

Figure 8. Repair Cycle Time (TAMCN = A, B, D, and E, priority 03)

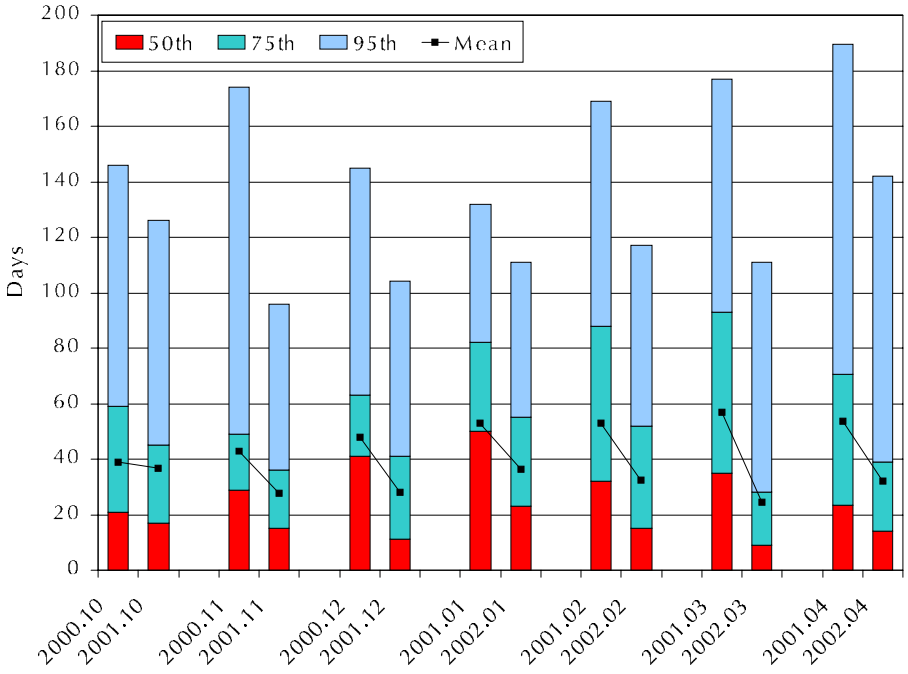


Supply Response Time

The charts show supply response time (SRT) at 2d FSSG, for October 2000 through April 2001, and October 2001 through April 2002. As with RCT, the data is divided by priority (03, 06, and 13) and TAMCN category (A, B, D, and E). As with RCT, the charts show the mean, median (50th percentile), 75th and 95th percentiles - so the top of the red bar is the median for the data.

In previous data, supply response time was called customer wait response time. The data presented here is the same – the time it takes for a mechanic to receive a repair part – but we have changed the name of the measure to prevent confusion with overall customer wait time (the time it takes for an operator to receive their equipment back in working order). Here, we define SRT as the time from the date the item was ordered to the date on which the corresponding

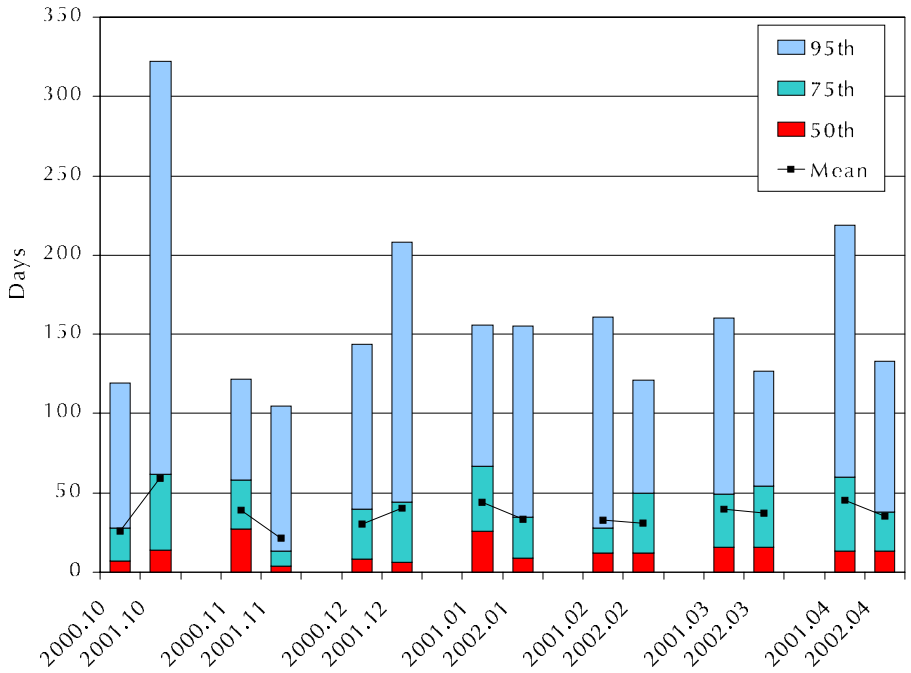
Figure 9. Repair Cycle Time (TAMCN = A, B, D, and E, priority 06)



local status code was assigned - this code is assigned when the item is received by the local supply organization.[6]

6. Ideally, we would like to use the time the item was received at the using unit as our end point. However, the data in ATLASSII+ is not accurately entered into that field. FSMAO performed some spot checks of the data and determined that the time between when the item is received at the supply point and when the using unit receives the item is normally less than one day. Therefore, our SRT may be one day shorter than 'true' SRT, but since our data is consistent, our definition does not affect any trends we see in the data.

Figure 10. Repair Cycle Time (TAMCN = A, B, D, and E, priority 13)



Overall SRT

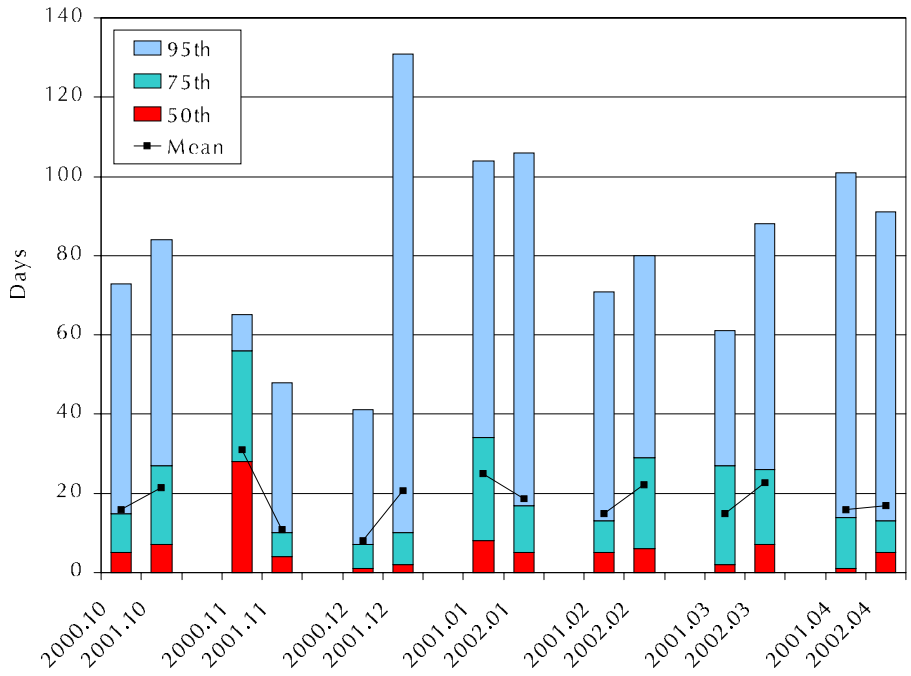
Recap of baseline data

The overall median supply response time, across all priorities, TAMCNs and types of maintenance, ranged from 8 days to 22 days. The median was fairly constant over time, but we did see an increase in the number of orders that take the longest amount of time. The 95th percentile was 91 days in October 2000 (meaning 95 percent of all orders are filled in 91 or fewer days), but rose to a peak of 166 days in February 2001. What this tells us is that the distribution of SRT was lengthening over time. As our baseline period progressed, a larger percentage of orders took longer to be completed.

Comparison with POC data

The median supply response time has decreased in recent months. Median SRT during the POC ranged from 1 to 8 days, a substantial

Figure 11. Repair Cycle Time (TAMCN = A, B, D, and E, preventive maintenance tasks)

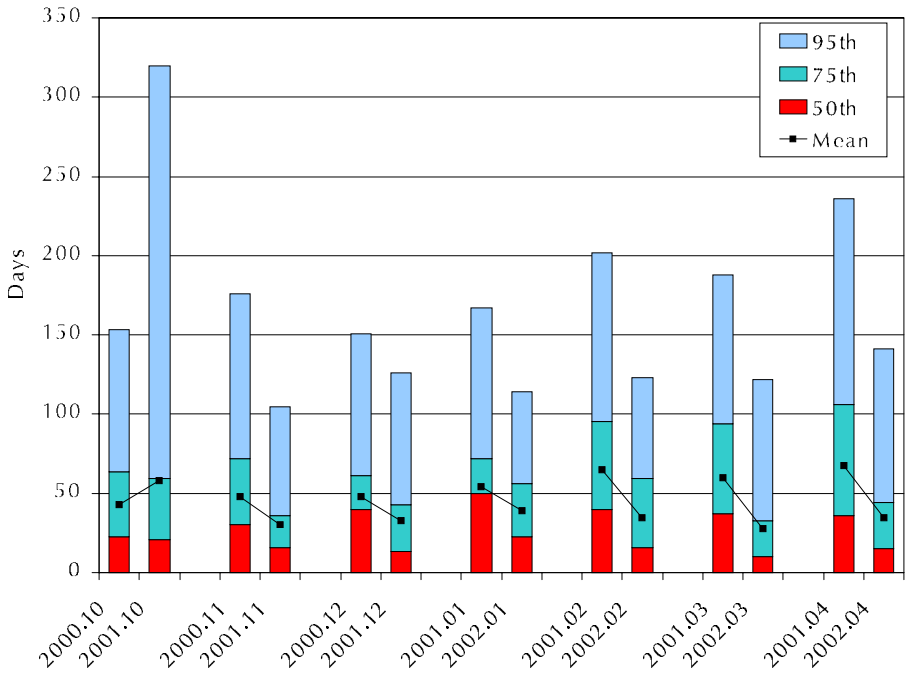


decrease from the baseline period (where the median ranged from 8 to 22 days). Bravo and Delta TAMCNs drove this decrease in median SRT, while SRTs for Alpha and Echo TAMCNs stayed approximately the same. (See figure 13)

We also see a drastic reduction in the variability of supply response time during the last few months as compared to the baseline period. The 95th percentile in October 2000 was 91 days, while in October 2001 the 95th percentile was 50 days and in March 2002, 47 days.

One possible reason for the reduced SRT is that the ISSA has been making two delivery runs a day, instead of only one, since January 2002. Another contributing factor could be that the ISSA is also beginning to stock more fast-moving parts than it did previously.

Figure 12. Repair Cycle Time (TAMCN = A, B, D, and E, corrective maintenance tasks)

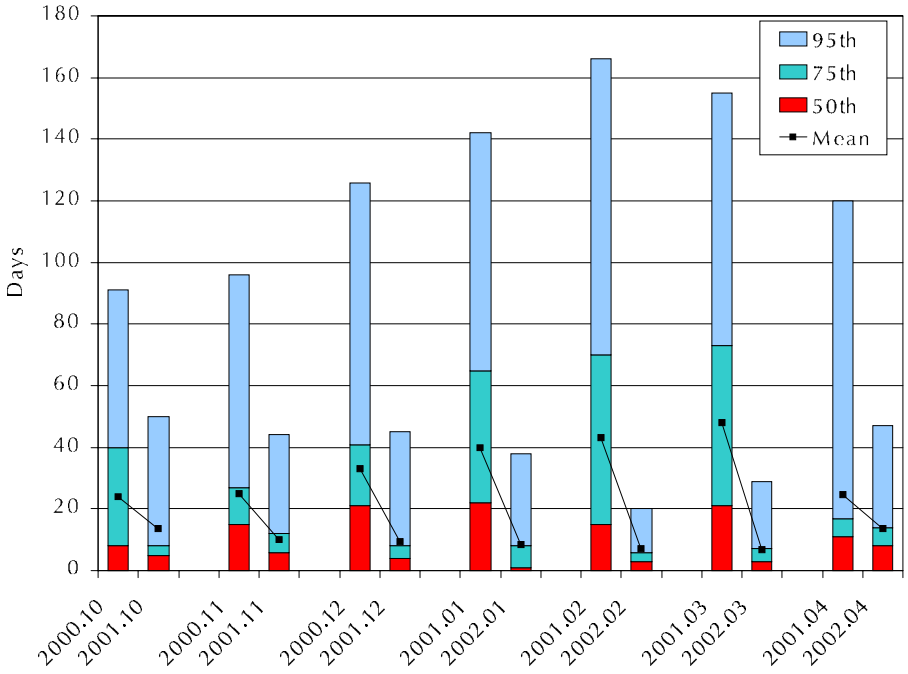


SRT by priority

There were no clear trends in the number of orders filled, but the proportion of priority 06 orders increased dramatically between the baseline and the proof of concept period, while the proportion of priority 13 orders fell. These changes mirror the changes in the priority designations for repair tasks, as we would expect. Comparing October 2000 with October 2001, we find that 22 percent of orders were priority 06 and 77 percent were priority 13 in 2000, while in 2001, the figures are almost reversed – 71 percent priority 06 and 23 percent priority 13. (See figure 14.)

Figures 15, 16, and 17 show SRT by priority. Again, care should be taken from drawing any conclusions from the priority 03 data. While the data appears to show large fluctuations in SRT for priority 03 orders, these changes are deceiving due to the small number of data

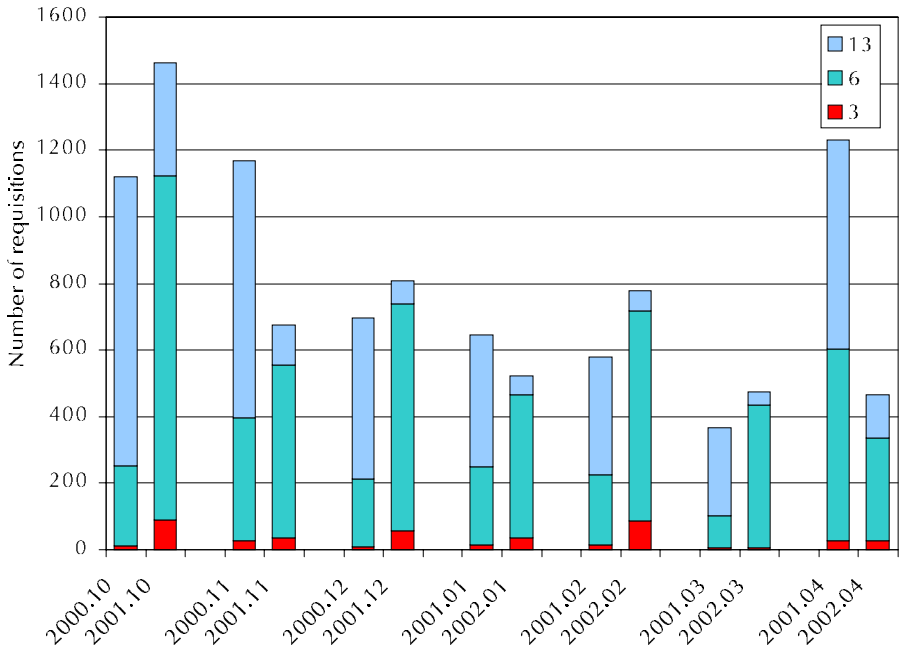
Figure 13. Supply Response Time (TAMCN = A, B, D, and E, priority 03, 06 and 13)



points and we should not draw statistical conclusions from this data.

For priority 06 requisitions, we do have enough data to draw statistical conclusions. As with overall SRT, when we compare the baseline with the POC data, we see a large decrease in the variability of this data. With two exceptions (October and February), priority 13 requisitions also show large decreases in variability. For example, in January 2002, 95 percent of all priority 06 requisitions were filled in 38 days or fewer (compared to 110 days or fewer in January 2001). For priority 13 requisitions, 95 percent were filled in 57 days or fewer in January 2002 (compared to 157 days or fewer in January 2001).

Figure 14. Number of requisitions, by priority



SRT by TAMCN

Figures 18, 19, 20, and 21 show SRT by TAMCN. In all cases, SRT has decreased when compared to the baseline period. Both the mean and the distribution are shorter during the POC than they were during the baseline period. For the baseline data, the mean for Bravo TAMCNs was statistically significantly different than the means for the other three categories. However, during the POC that difference has disappeared - all four categories have similar means. With a few exceptions, the median SRT is 9 days or fewer for all four TAMCN categories during the period October 2001 - April 2002.

Figure 15. Supply Response Time (TAMCN = A, B, D, and E, priority 03)

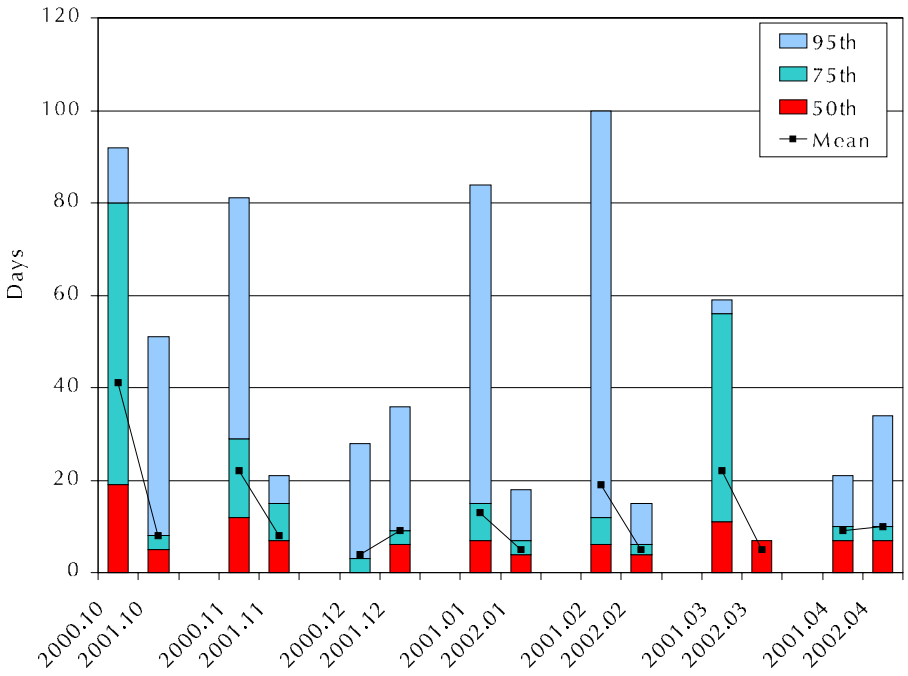


Figure 16. Supply Response Time (TAMCN = A, B, D, and E, priority 06)

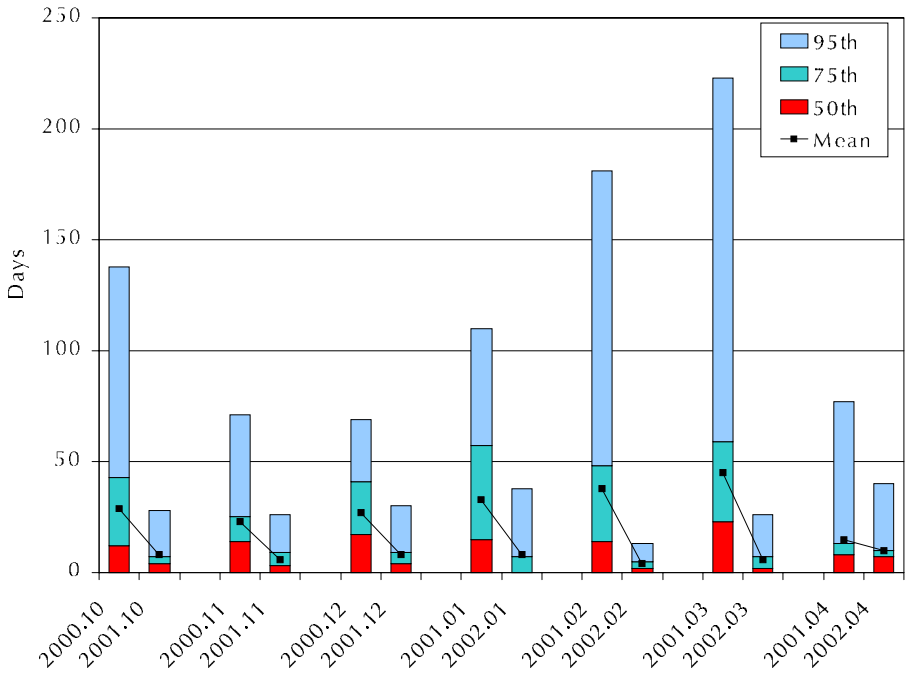


Figure 17. Supply Response Time (TAMCN = A, B, D, and E, priority 13)

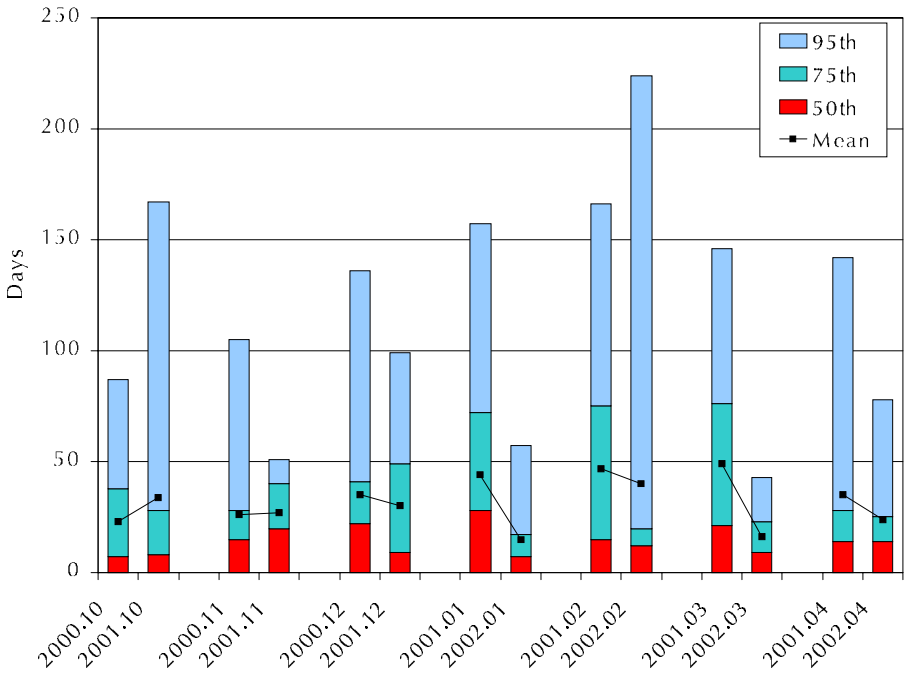


Figure 18. Supply Response Time (TAMCN = A)

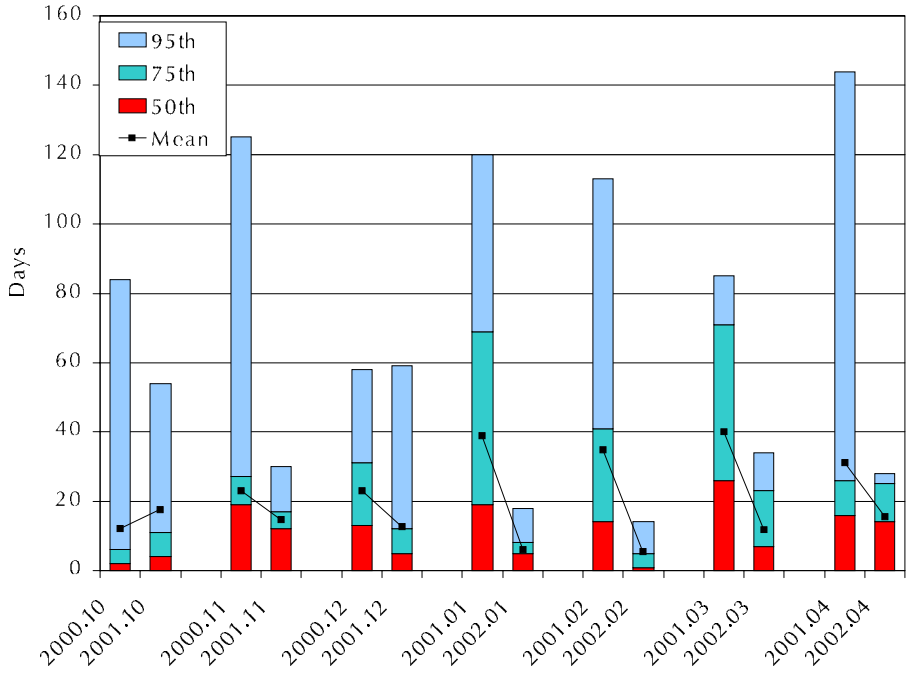


Figure 19. Supply Response Time (TAMCN = B)

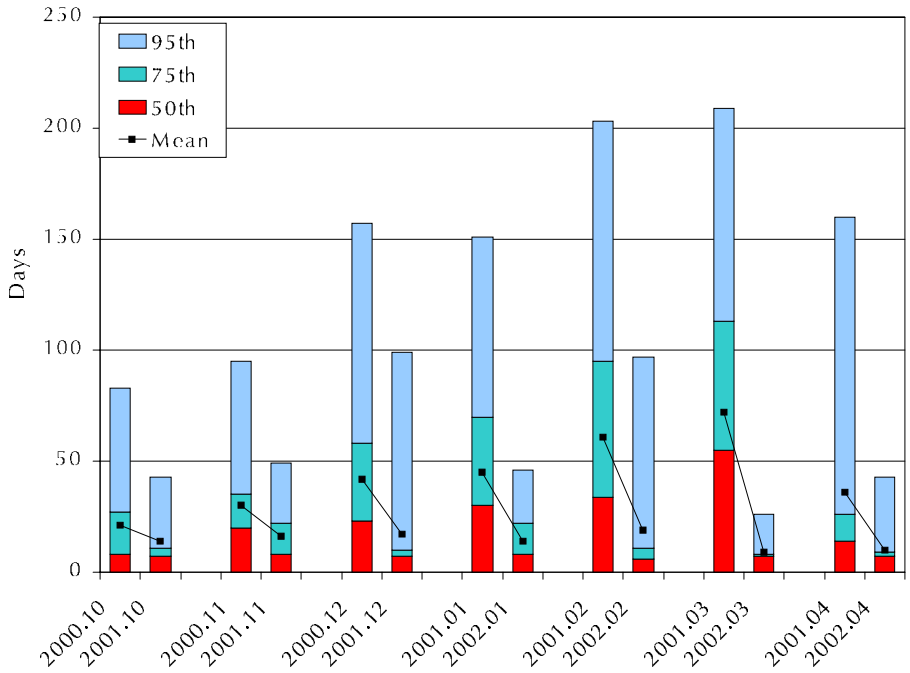


Figure 20. Supply Response Time (TAMCN = D)

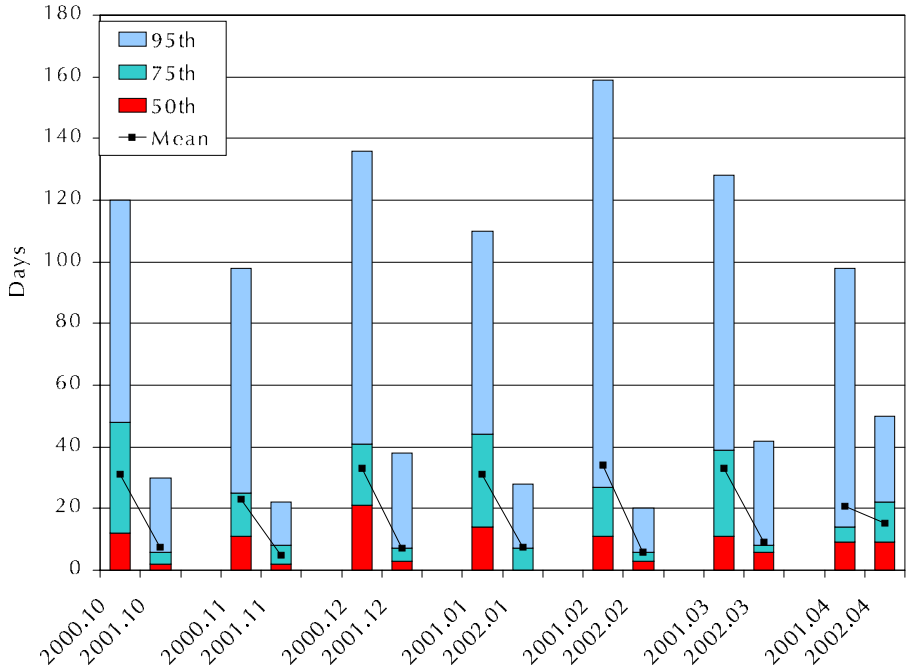
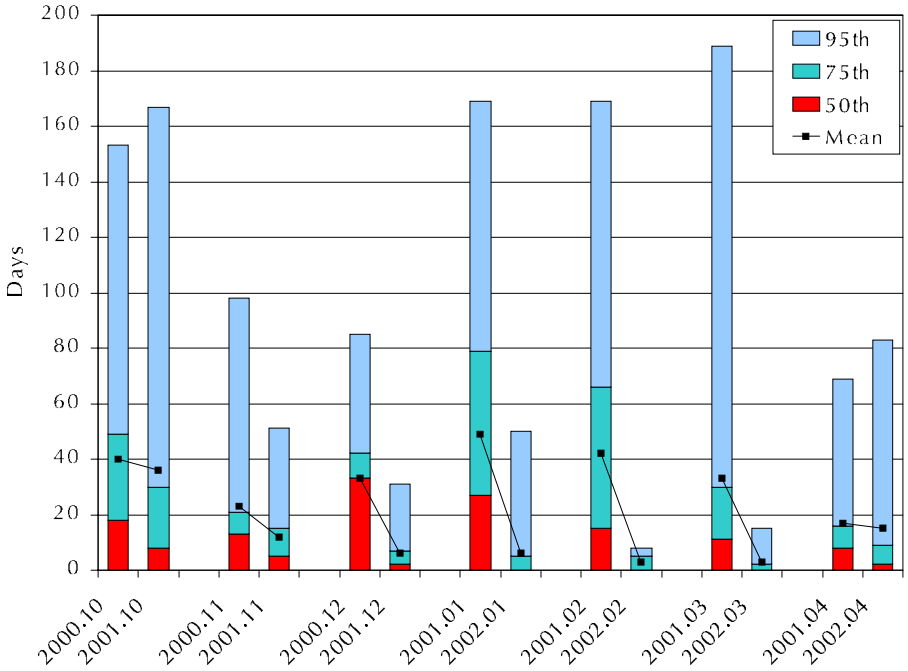


Figure 21. Supply Response Time (TAMCN = E)



Maintenance and supply personnel time allocation

In the previous section, we presented data on trends in materiel readiness rates, repair cycle time, and supply response time. These measures represent some overall performance measures for the maintenance and supply systems. However, this data does not provide much information on *why* we see the trends presented. To understand the reasons behind these results, in this section we compare time allocation for maintenance and supply personnel, as reported in the baseline period and at the midterm point of the POC. Knowing where personnel spend their time helps to focus reform efforts on making processes more effective and more efficient.

This section contains the following information:

- Comparisons of time allocation across functions for maintenance and supply personnel
- Comparison of confidence in performing MOS for maintenance personnel

We relate this information to the hypotheses to be tested during the POC.

Maintenance processes and man-hours per function

One of the primary goals of ILC is to streamline the maintenance process. To determine progress toward this general goal, the ILC Proof of Concept (POC) plan for 2d FSSG established a series of hypotheses regarding the desired effects of implementing the ILC initiatives. The ILC POC Plan also identified performance measures that we will use to help evaluate these hypotheses. We will examine these performance measures before and after the implementation of the relevant ILC initiatives. With respect to maintenance migration and its impact

on maintenance man hours, the hypotheses in the POC Plan are as follows:

- Hypothesis 1: Support will become more responsive to the customer as there will be fewer non-value added steps and thus a direct link to the intermediate level of maintenance.
- Hypothesis 2: Economies of scale will be gained as the overall administrative burden associated with monitoring parts (Pre-expended bins(PEB)), layettes, maintenance records and the like will be lessened.
- Hypothesis 3: Labor productivity will increase, as maintenance sites will have a more streamlined approach due to the elimination of the EOM's and a focus/redefinition of intermediate maintenance.
- Hypothesis 4: Training of junior maintenance personnel will broaden/improve, as they will have more direct access to mechanics/technicians with experience in 3rd EOM repairs.

We use these hypotheses as a framework to discuss the data collected from surveys of FSSG personnel on the time spent on various activities. Here, we compare the baseline to the results reported in the mid-term surveys. At this point, not enough time has passed to test all of the hypotheses. Therefore, we provide only some interim conclusions here.

Changes in the maintenance process

One of the possible barriers to faster repairs in the pre-ILC process was the number of redundant inspections, as equipment was inspected at both the 2nd and 3rd EOM shops. With the implementation of ILC concepts, the vast majority of 2nd EOM work migrated to 2d Maintenance Battalion from the other battalions in the FSSG. The result of this migration is fewer separate limited technical inspections (LTI), since there are no longer similar inspections at the 2nd and 3rd EOM. Instead, quality control personnel at Maintenance Battalion handle all the induction inspections

Another issue maintenance personnel mentioned as a barrier to reduced repair cycle times was a lack of parts. Most maintenance shops had no control over the parts ordering process, and planning maintenance was difficult due to limited estimates on parts arrival times. Each maintenance activity dedicated several clerk-level billets (2-4) to finding parts through alternative sources, meaning independent research into source of supply and credit card orders. The data on supply response time shows that the ISSA has helped reduce waiting times for parts, addressing this particular issue.

Time allocation

The next step is to examine how much time personnel spend on each step in the maintenance process, and whether that allocation of time has changed as the POC has progressed. We designed surveys for maintenance personnel to record their activities during their workday. We provided these surveys to all maintenance personnel in 2d FSSG and asked them to record their time for 10 work days during two separate periods: April 2001 (baseline) and January/February 2002 (midterm). We asked maintenance personnel to indicate how much time they spent each day on the following activities:

- Accepting inspections
- Troubleshooting
- Ordering parts
- Repairs
- Quality control (QC)
- Administration
- Supervising
- Outside their MOS
- Mentoring
- Other activities.

Our analysis in this section is based on baseline data from 1,116 surveys returned with complete data and midterm data from 2658 sur-

veys[7]. In the baseline report, we often broke the data down by battalion in our analysis of the data. With the consolidation of maintenance personnel, 96 percent of our midterm surveys came from 2d Maintenance Battalion. Therefore, we do not do similar battalion analysis in this report. Instead, we break the data into the primary maintenance Military Occupational Specialty (MOS) categories: 11xx (Utilities); 13xx (Engineer, Construction, Facilities and Equipment); 21xx (Ordnance); 28xx (Data/Communications Maintenance); and 35xx (Motor Transport). Details on the data collected are in Appendix D. Here, we discuss the data using the hypotheses presented in the ILC POC Plan.

Hypothesis 1: Increased customer support

The first maintenance hypothesis for the ILC POC is that the migration of maintenance will increase the responsiveness of maintenance support activities to the customer through a decreased administrative burden for both the using units and maintenance shops. Therefore, we examine the amount of time devoted to administrative activities by maintenance personnel. On the survey, we defined administrative activities (admin) as including, but not limited to: parts management (PEB), publications management, tool control, calibration control, modification control, MOS training, HAZMAT control, property control, preventive maintenance (PM) scheduling and 1st echelon PMs.

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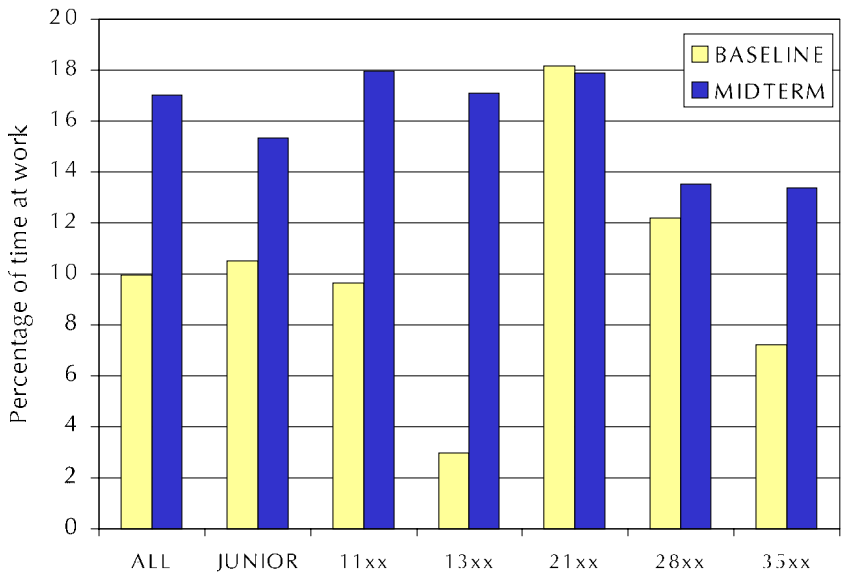
7. We cannot determine the exact percentage of 2d FSSG maintenance personnel who completed surveys, since each Marine could have completed from 1 to 10 surveys. We can provide a minimum sample size, however. For the baseline, 2d FSSG reported 1928 maintenance personnel on-hand. If all 1928 personnel had returned all 10 surveys, we would have collected 19,280 surveys. Our baseline sample could include 1 survey from each of 1,116 Marines (58 percent of personnel), or 10 surveys from 111 Marines (6 percent of personnel). The actual sample lies between these two extremes. Similarly, for the midterm, 2d FSSG reported 1688 maintenance personnel on-hand. If all 1688 personnel had returned all 10 surveys, we would have collected 16,880 surveys. Our midterm sample is larger than 1 survey per Marine (2658 surveys). This does not mean that every Marine filled out at least one survey, since it could also be the case that we had 10 surveys from 265 Marines (16 percent of personnel).

At this point, we do not see a reduction in time spent on administrative activities. Across the sample, the percentage of time spent on administrative activities rose from 10 percent to 17 percent. We also looked at other categories of the data: junior enlisted (PVT through CPL), 11xx's, 13xx's, 21xx's, 28xx's and 35xx's). In all categories where there was a significant change, the time spent on administrative activities increased from the baseline to the midterm sample. The increase was particularly large for the 13xx's - from 3 percent to 17 percent.

Figure 22 shows the time spent on administrative activities by maintenance personnel.

Figure 22. Time spent on administrative activities by maintenance personnel



It is important to note that there could have been changes in how the survey respondents classified their activities between the two surveys. Unfortunately, we cannot know without extensive interviews whether that occurred. However, it seems clear at this point that the administrative burden for maintenance personnel has not yet fallen.

Hypothesis 2: Economies of scale

The second hypothesis asserts that economies of scale will be gained through the migration of maintenance as the overall administrative burden associated with monitoring parts, layettes, and maintenance records will lessen. As we saw in the previous section, this result has not occurred to this point. The third set of surveys, scheduled for summer 2002, will allow us to look at whether administrative time decreases by the end of the POC.

Hypothesis 3: Increased labor productivity

The third ILC POC hypothesis relating to maintenance man hours asserts that labor productivity should increase as maintenance shops will have a more streamlined approach due to the consolidation of the EOM's and the refocus/redefinition of intermediate maintenance activity. To evaluate this hypothesis, we examine the impact of implementing the ILC initiatives on the ratio of time spent on actual maintenance activities to time spent on other things. To this end we compare time spent on the following three categories of activities:

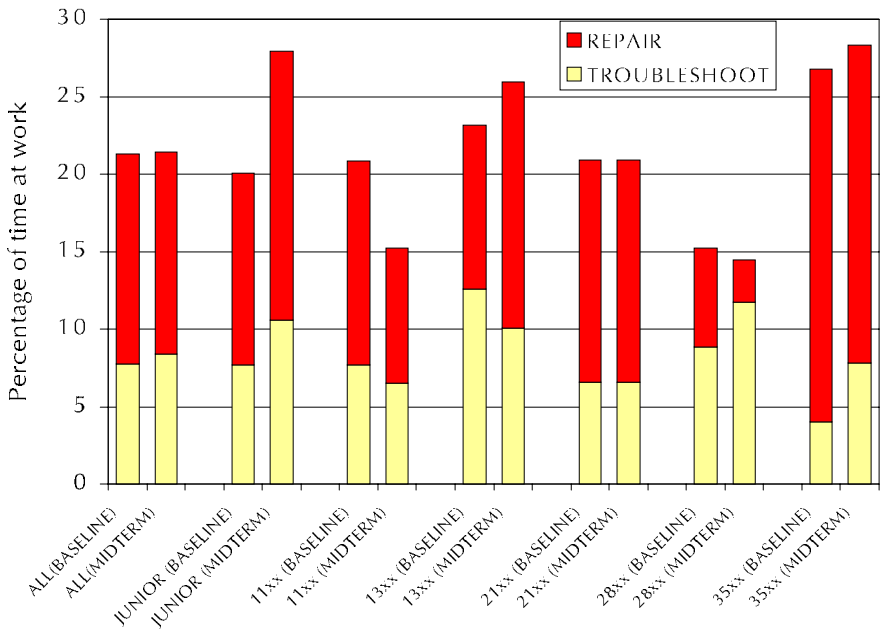
- Maintenance and related activities
- Overhead activities related to the maintenance process
- Activities that are unrelated to the maintenance process.

Maintenance and related activities

We first examine the time spent on direct maintenance activities, specifically the repair and troubleshooting categories from the time sheets. Figure 23 compares the time spent on these two activities during the baseline period with the midterm period. While there does not seem to be much of a change for maintenance personnel as a whole, junior enlisted Marines (PVT through CPL) reported spending more time on these activities at the midterm point than during

the baseline period (28 percent of their time at work compared to 20 percent). This result, while an improvement, still shows that much of a maintenance Marine's time is spent on functions other than maintenance.

Figure 23. Time spent by maintenance personnel on troubleshooting and repairs



One might think that more time spent troubleshooting might lead to less time spent doing repairs - determining exactly what the problem is before attempting a repair might eliminate some unnecessary repairs. For the 28xx's, we see this pattern - they reported statistically significant increases in time spent troubleshooting (9 percent to 12 percent of their time) and corresponding decreases in repair time (6 percent to 3 percent of their time).

We see the reverse pattern for the 13xx's - less time spent troubleshooting (13 percent to 10 percent) and more time spent performing repairs (11 percent to 16 percent). Both of these results support the

idea that additional troubleshooting may help to decrease repair time by preventing unnecessary repairs. It is not clear why the 13xx's (Engineer Equipment) are now spending less time troubleshooting and the 28xx's (Communications) are doing the opposite.

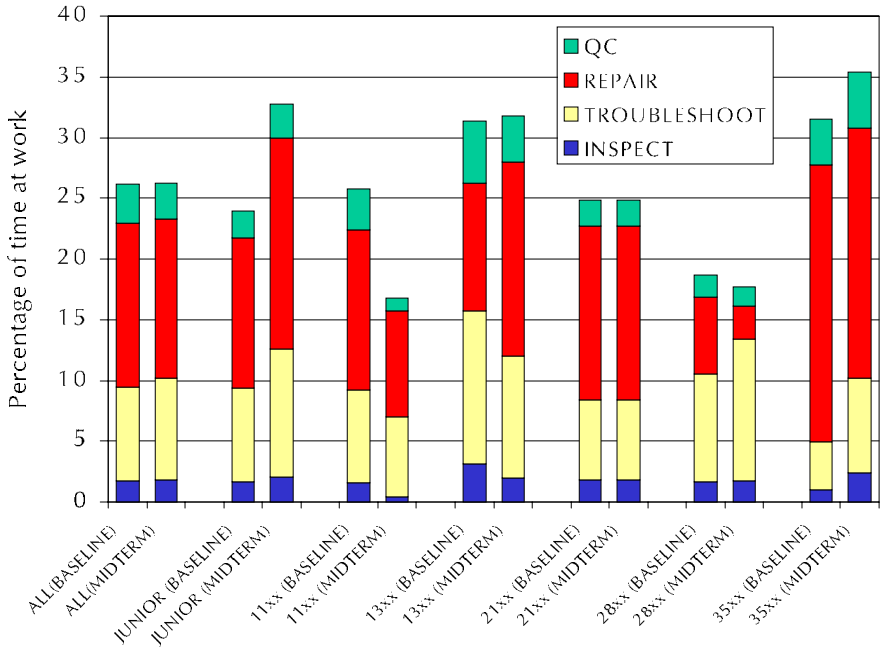
There are several other functions included on the maintenance time sheets that are integral to the maintenance process, specifically quality control and accepting inspections. The maintenance process we saw before the implementation of ILC concepts could have included up to seven QC inspections and therefore also a maximum of seven occasions for accepting these inspections. We, therefore, considered it important to include these maintenance-related functions in our estimates of time spent on maintenance activities as well. This is one way in which we can examine whether the consolidation of 2nd and 3rd echelon maintenance reduced the time spent on these inspections, many of which were redundant.

Figure 24 shows all four maintenance-related activities. While we do not see a reduction in time spent on quality control and/or inspections for the entire sample, 11xx's (Utilities) do report spending less time on these two functions in the midterm surveys as compared to the baseline surveys (2 percent as compared to 5 percent of their time). 13xx's (Engineer Equipment) also report similar decreases (from 8 percent to 6 percent of their time). This percentage difference translates into about 15 minutes (assuming an 8 hour workday) a day. While that may not seem like very much time, considering that time spent on all four maintenance activities is often less than 2 hours a day (again assuming an 8 hour workday), 15 extra minutes to perform troubleshooting or repair duties is a substantial increase.

In contrast, 35xx's (Motor transport) report an increase in time spent on these two functions (5 percent to 7 percent). Part of the reason for the increase in time spent on inspections by the 35xx's may be the 'bumper-to-bumper' inspections that 2d Maintenance Battalion implemented when the POC began. We cannot separate the effects of that program from a possible reduction in redundant inspections caused by the consolidation of the two echelons of maintenance.

As we noted in the baseline assessment, without an increase in the total time spent on maintenance related activities each day, the effects

Figure 24. Time spent by maintenance personnel on maintenance activities



from implementing ILC concepts may be limited. The data from the midterm surveys shows that junior enlisted maintenance personnel are spending a higher percentage of their time on maintenance than they were before implementing ILC. However, they still spend only one-third of their time at work performing these maintenance-related functions.

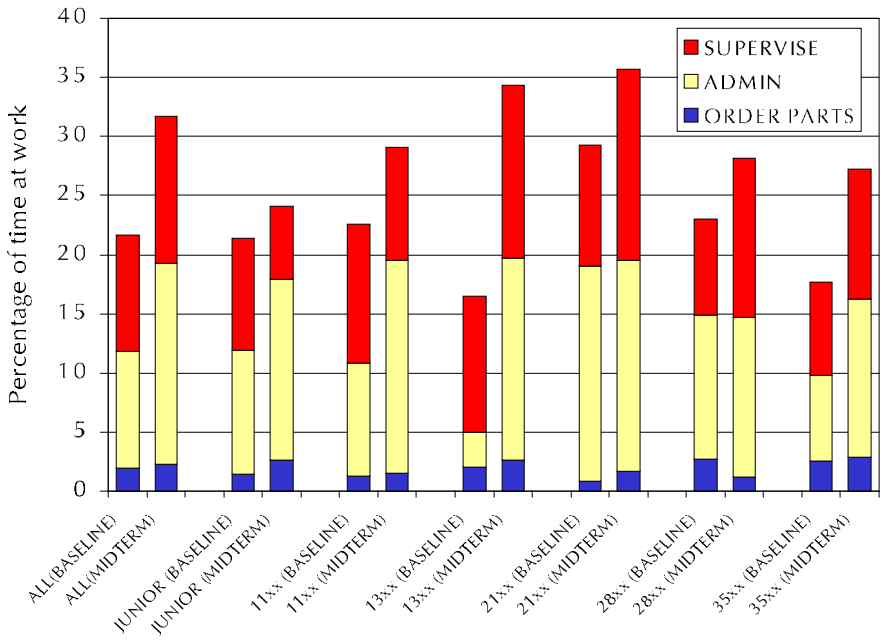
Overhead activities in the maintenance process

We next examine the amount of time maintenance personnel spend on activities that are not directly related to maintenance but are instead part of the overhead associated with the maintenance process. Our estimates of the amount of time devoted to overhead activities include general administrative activities, ordering parts, and supervising functions listed on the maintenance time sheets.

Figure 25 compares time spent on these overhead activities as reported in the baseline sample and in the midterm sample. The main difference between the two samples is the amount of time spent on administrative activities - three of the five MOS groups (11xx, 13xx and 35xx), as well as junior enlisted Marines in all MOSs, all showed significant increases in administrative time. Three of the five MOS groups (21xx, 28xx and 35xx) also reported significant increases in the amount of time spent supervising.

We should be careful in interpreting these results. These increases may have occurred because of changes in how Marines interpreted the survey. In the next section, we look at time reported on 'outside MOS' and 'other' activities. These two categories often showed decreases in time, and the increases in administrative time, for example, may be due to a re-classification of 'outside MOS' or 'other' time into administrative time.

Figure 25. Time spent by maintenance personnel on overhead activities



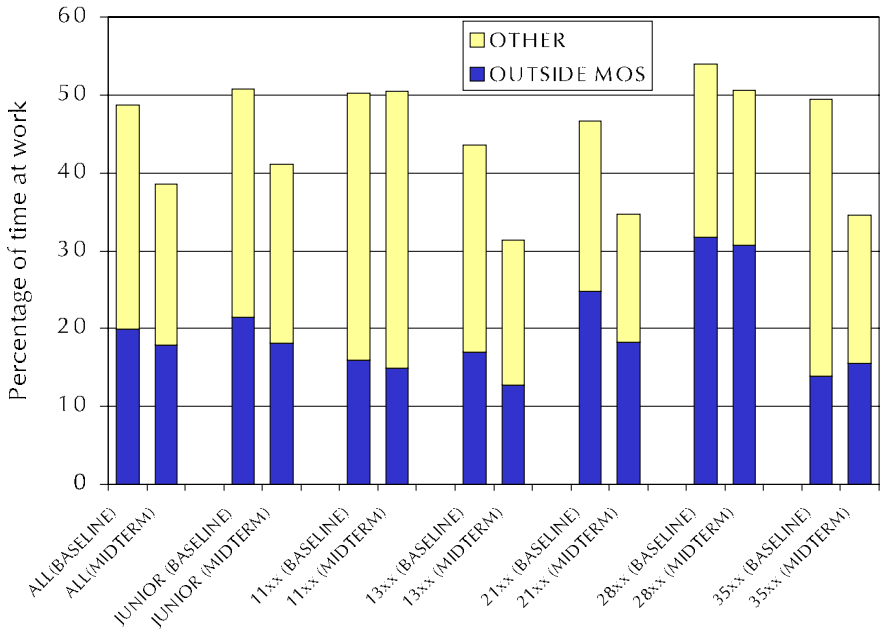
Activities unrelated to maintenance process

Finally, we must also consider the implications of time spent on activities external to the maintenance process or those that were classified as "other" and "outside MOS" on the time sheets. While we had initially defined the "outside MOS" category as including activities like physical training, armory, field days and formations, based on the descriptions from the time sheets, we found that maintenance Marines frequently used the "other" category to indicate time spent on these types of activities. Therefore, we consider both categories when we examine how much time maintenance personnel spend away from their MOS.

Figure 26 compares the baseline and midterm results for these two functions. We continue to see that a substantial portion of maintenance Marines' time is spent on activities unrelated to the maintenance process, though as we stated in the previous section, it is not possible to know whether the decreases we see are simply a re-categorization into administrative activities or an actual decrease in these other activities. 35xx's show the largest decrease (from 50 percent to 35 percent of their time at work).

To test whether this may indeed have been the case - that activities were just reported differently between the two surveys - we looked at the total time spent on these three functions - administrative, outside MOS and 'other'. Figure 27 shows this set of activities on one chart. This figure shows that these three activities are where the maintenance Marines spend the majority of their time - ranging from a high of 69 percent for 11xx's to a low of 48 percent for both the 13xx's and 35xx's. Without a change in the amount of time spent here, increasing the amount of time Marines actually perform maintenance,

Figure 26. Time spent by maintenance personnel on activities unrelated to the maintenance process



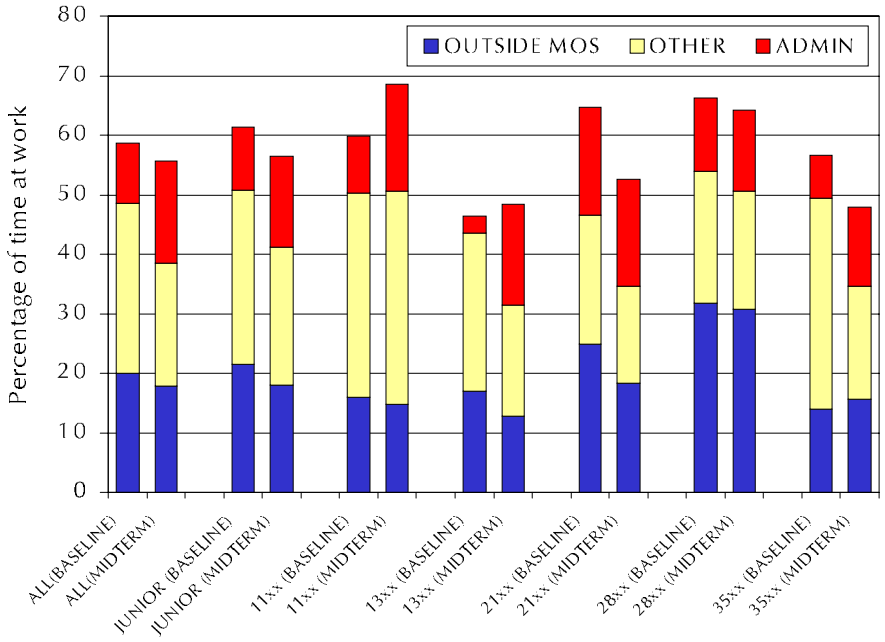
changes within the maintenance process itself may not produce any large effects in terms of increasing operational availability of equipment.

Hypothesis 4: On-the-job training

The last hypothesis related to maintenance man hours asserts that the migration of maintenance will result in improved on-the-job training for junior personnel through increased access to experienced mechanics and technicians. To address this issue, we examine time spent on mentoring activities as indicated by the maintenance time sheets. Mentoring was defined as "time spent providing (or receiving) one-on-one guidance in the performance of your MOS" on the survey.

Comparing the baseline and midterm surveys does not show any overall trends (see figure 28). For some MOS groups, the amount of men-

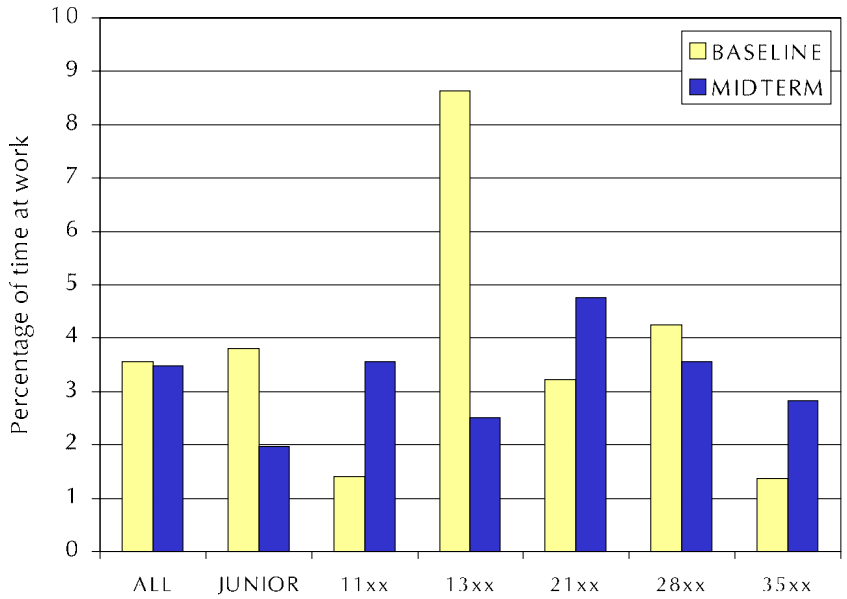
Figure 27. Time spent by maintenance personnel on administrative, outside MOS and other activities



toring reported decreased (13xx and 28xx) while for others, it increased (11xx, 21xx and 35xx). However, the amount of time spent either providing or receiving mentoring remained very low. 13xx's reported the least amount of time (3 percent, or about 12 minutes of an 8 hour workday), while 21xx's reported the most time (5 percent or about 23 minutes of an 8 hour workday). In any case, mentoring times do not appear to have increased substantially to this point in the POC.

We asked respondents to separate "mentoring" activities from "supervising" on the surveys. However, in our analysis, we also considered the possibility that mentoring activities may have been subsumed into the "supervisory" category of the time sheet. To examine this possibility, we tested the frequency with which mentoring and supervising activities occurred concurrently. We found that there was a less than one percent correlation between the occurrence of the two activities and therefore concluded that, in terms of filling out the survey, supervising and men-

Figure 28. Time spent by maintenance personnel on mentoring



toring activities were mutually exclusive in the minds of maintenance personnel.

Training quality for maintenance personnel

In addition to the hypotheses related to maintenance man-hours, the ILC POC Plan includes a hypothesis addressing training for maintenance personnel:

- Training of junior maintenance personnel will broaden/improve, as they will have more direct access to mechanics/technicians with experience in 3rd EOM repairs

We can use the information on mentoring activities from the man-hours per function surveys (see previous section) to test this hypothesis. However, as our primary source of information, we gave surveys to maintenance personnel consisting of the Individual Training Stan-

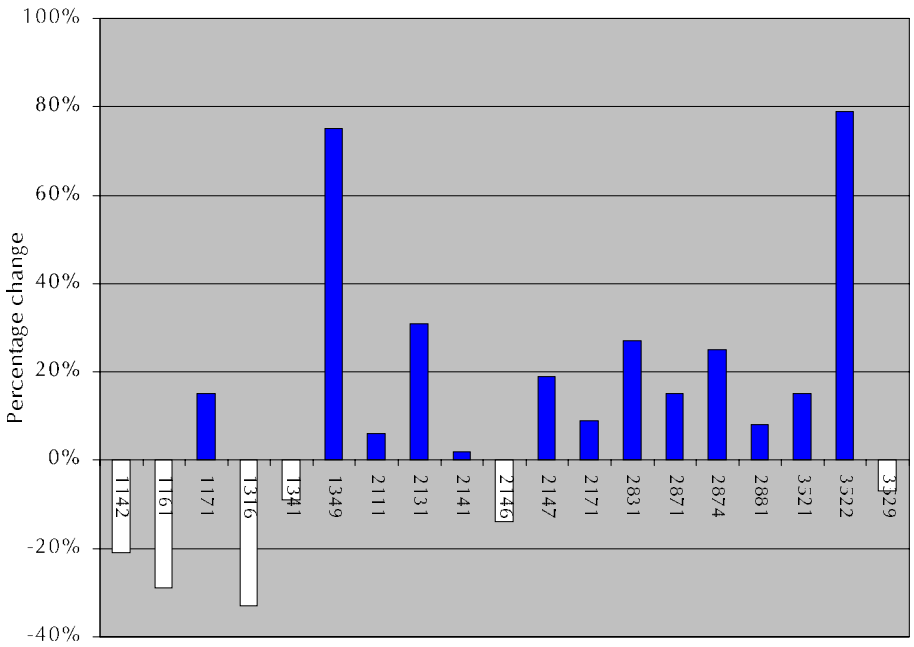
dards (ITS) for each MOS. We asked Marines to rate the confidence in their ability to execute each standard on a scale from poor (1) to excellent (5). A total of 677 surveys representing 25 different Military Occupational Specialties (MOS) were completed in the baseline set of surveys, and 622 surveys representing 27 different MOSs in the midterm sample. Details on this data are in appendix D.

When we compare the two sets of surveys, two points stand out:

- For a majority of MOSs, more Marines are working on duties within their MOS than were before the POC.
- In many cases, confidence in performing ITSs within individual MOSs has increased since the baseline surveys were administered.

Figure 29 shows the proportional change in the number of Marines working in their MOS from the baseline to the midterm point of the POC.[8]

Figure 29. Proportional change in the number of Marines working within their MOS

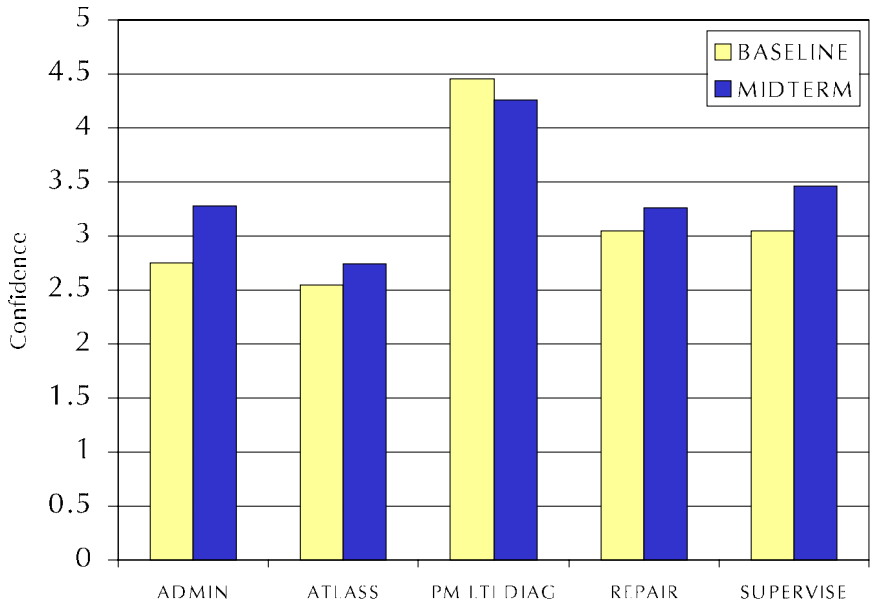


For several of the MOSs, where we had enough data to make meaningful comparisons. we grouped ITSs together if they related to similar functions - for example, repairs, ATLASSII+ functions, LTIs, and so forth. For four of the six MOSs represented here (1161, 1171, 1316

8. The large spikes for MOSs 1349 and 3522 are small sample size issues. For example. in the baseline, we had only one response for MOS=1349, and that person was not working within their MOS. In the midterm sample, there were four responses for MOS=1349, and three of those Marines were working within their MOS. Similarly, for MOS=3522, zero of four respondents to the baseline survey were working within their MOS, while 15 of 19 respondents to the midterm survey were working within their MOS.

and 3521), we see a substantial increase in the confidence Marines have using ATLASSII+, as we would expect, given the extra time they have had to use the system. Figures 30 - 35 show the results.

Figure 30. Confidence in performing ITS - MOS 1142 (Electrical Equipment Repair Specialist)



These results indicate that maintenance Marines feel more confident performing their MOS duties than they did before the POC began. The increase in confidence could be due to a variety of factors, one of which is more time spent performing their MOS duties. Junior maintenance Marines reported spending more time on maintenance-related activities at the midterm point of the POC than they were spending before the POC. Since they may be practicing their MOS duties more, they may feel more confident in their ability to perform their MOS.

Figure 31. Confidence in performing ITS - MOS 1161 (Refrigeration Mechanic)

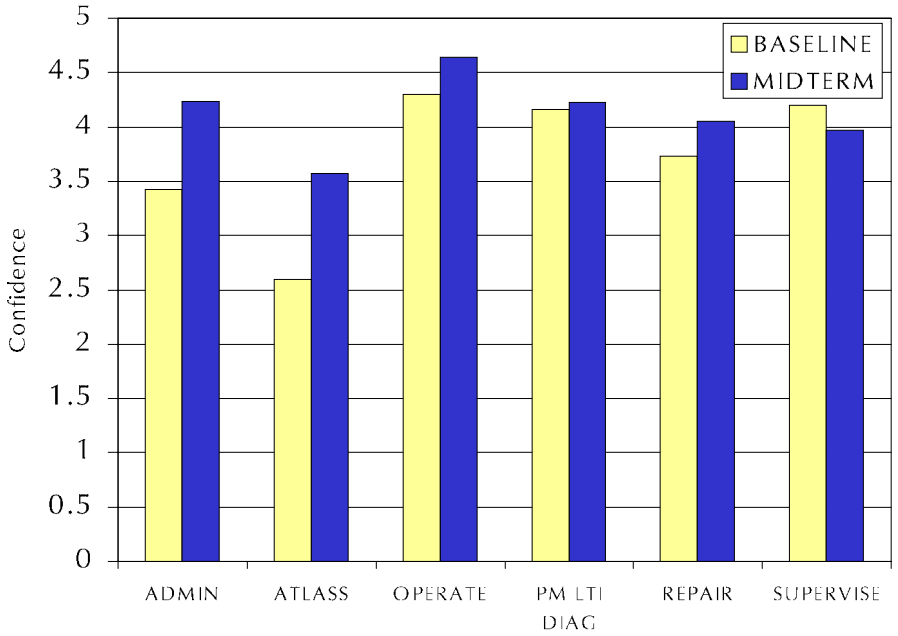


Figure 32. Confidence in performing ITS - MOS 1171 (Hygiene Equipment Operator)

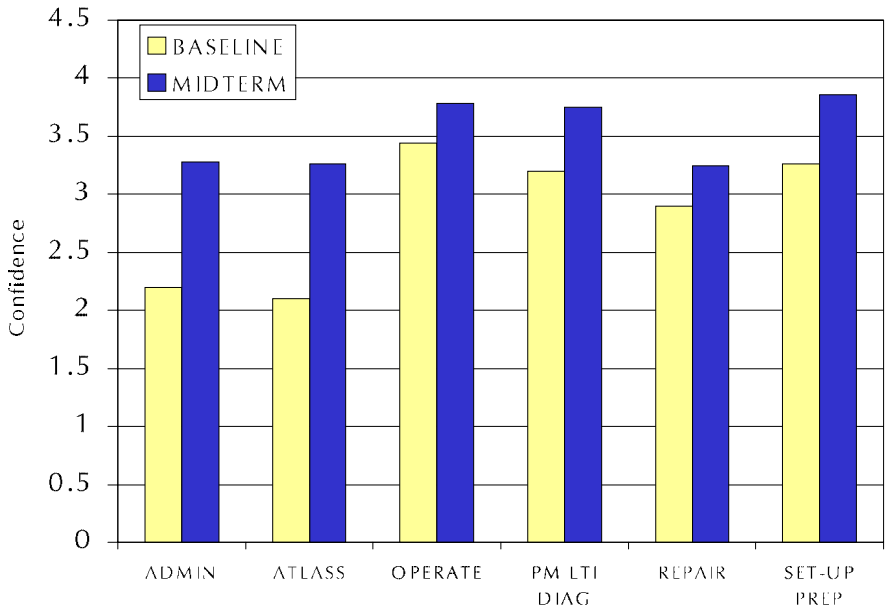


Figure 33. Confidence in performing ITS - MOS 1316 (Metal Worker)

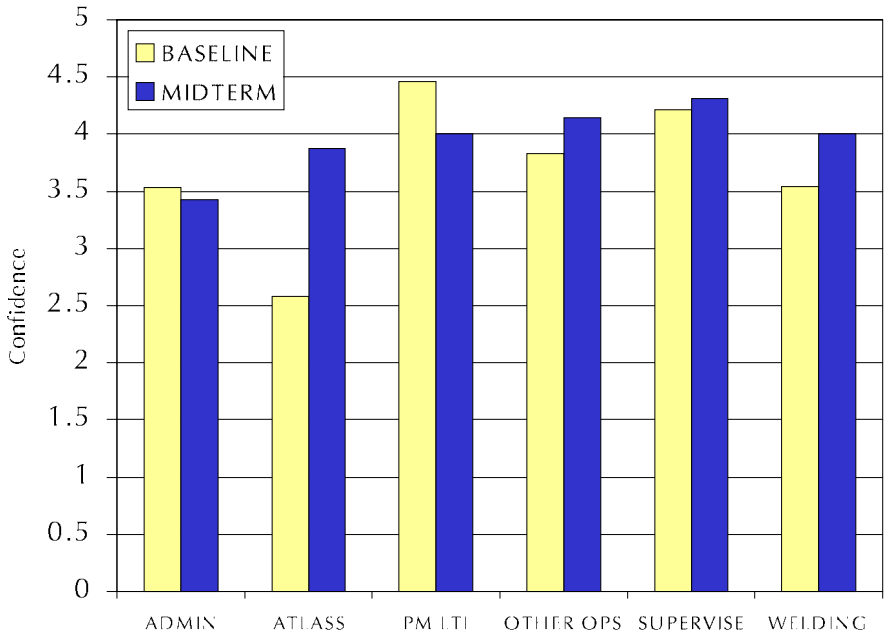


Figure 34. Confidence in performing ITS - MOS 2147 (Light Armored Vehicle Repairer/Technician)

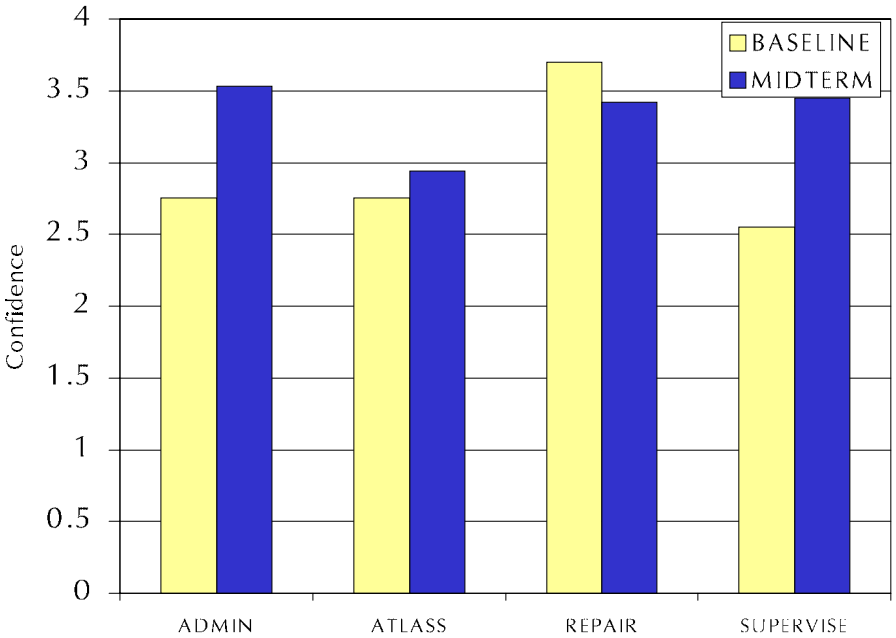
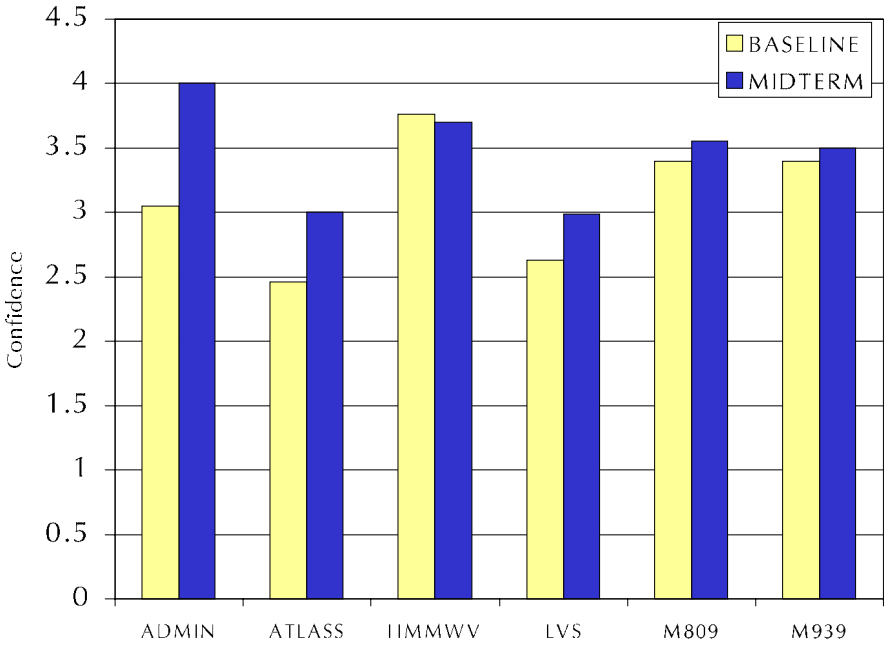


Figure 35. Confidence in performing ITS - MOS 3521 (Organizational Automotive Mechanic)



Supply processes and man-hours per function

The ILC goal of streamlining logistics functions also applies to supply processes. As with the maintenance related hypotheses, the ILC POC Plan also includes hypotheses directed at supply activities. These hypotheses include the following:

- Hypothesis 1: Fiscal responsibilities will be consolidated, reducing fiscal burdens and resource requirements on the warfighter.
- Hypothesis 2: The using unit will be relieved of redundancy and overlapping functionality, while uniting skill set, thereby allowing the warfighter to focus on core competency.
- Hypothesis 3: Inventory will be consolidated and reduced thus reducing resource requirements.
- Hypothesis 4: Economies of scale will be gained, as the overall administrative burden associated with monitoring inventories will be lessened.

We again use these hypotheses as a framework to discuss the data collected from surveys of FSSG personnel on the time spent on various activities. In this section, we compare the baseline time allocation with the midterm time allocation to test these hypotheses.

2d FSSG implemented the supply portion of the proof of concept later than the maintenance portions. In fact, the primary consolidation of supply personnel began near the end of 2001, continuing through February 2002. Therefore, supply processes were still in a transitional phase when the midterm surveys were administered and the results reported here may not be what we would expect to see after these new processes have been in place for a longer period of time. Analyzing the final set of surveys at the conclusion of the proof of concept should give us a more accurate picture of the effects of implementing ILC concepts. As with all the data, however, it is not possible to separate out the effects of ILC from the effects of other initiatives occurring simultaneously.

Processes

As of January 2002 (when the time allocation surveys were administered), there had been some changes in supply processes, but the final form of these processes was not yet complete. The final assessment report will include more information about the new supply processes. Here, we briefly summarize some of the changes.

Consumable parts supply

The process begins with the mechanic ordering a consumable part in ATLASSII+ and ends when the mechanic receives the part. One issue reported during the baseline analysis was the low fill rate at the ISSA. The Intermediate Supply Support Activity (ISSA) reported a 32% fill-rate for consumable parts, down from 95% about two years ago. While fill-rate in and of itself is not something that measures the performance of the overall supply chain, a drop of this magnitude likely had an effect on overall performance and should be noted. Indications are that the ISSA is beginning to stock more fast-moving parts than it was before the POC. Greater stocks, plus an additional delivery run each day (two runs a day instead of only one) has reduced mechanics' supply response time substantially during the POC.

Financial flows

The budget flow for maintenance is through the supply activities. The only costs captured are parts costs. Each quarter, the Group provides funds to each Battalion supply activity. As the companies and/or platoons order parts through ATLASSII+, the parts cost is automatically debited against the balance. This provides lower levels of the organization near-real time visibility of their financial status.

Each using unit has two fiscal accounts assigned to it in the current supply system: a planning estimate (PE) account and a requisitioning authority (RA) account. These accounts determine how the using unit can spend the funds that have been allocated to them.

- The planning estimate (PE) account gives the using units access to real money that can be used to buy things through the Direct Stock Support Center (DSSC) or open purchase

(IMPAC) cards for items that are not available through the automated supply system.

- The requisition authority (RA) account can only be used to purchase items through the traditional supply system via the ISSA.

At the ISSA, using units' money is not actually separated into two accounts but instead is centralized a large PE account. The RA dollars contained in the using unit's budget have a mirror image PE dollar amount at the ISSA. Therefore when the using unit obligates an RA dollar, the ISSA subsequently obligates a PE dollar. The distribution of funds between the using unit's RA and PE accounts are decided before the quarterly allocations since transfer of funds can be difficult.

As 2d FSSG has consolidated supply functions, they have transferred the majority of the using unit RA dollars for repairs to Maintenance Bn. All the units still maintain RA and PE accounts, but the RA accounts are much smaller—with the exception of Maintenance Bn, whose account has increased substantially.

Time allocation

The next step is to examine how much time personnel spend on various supply processes. As with maintenance personnel, we designed surveys for supply personnel to record their activities during their workday. We provided these surveys to all supply personnel in 2d FSSG and asked them to record their time for 10 work days. We asked supply personnel to indicate how much time they spent each day on the following activities:

- Property management
- Document control
- Fiscal management
- Warehousing
- Outside their MOS
- Supervising

- Mentoring
- Other activities.

Our analysis in this section is based on data from 260 surveys returned with complete data for the baseline sample, and 1186 surveys for the midterm sample.[9] [10] Figure 36 summarizes the data for all the activities reported by supply personnel. Details on the data collected are in Appendix D.

Hypothesis 1: Reduced fiscal management

The first hypothesis relating to supply man hours suggest that through the supply consolidation initiatives, the fiscal burdens and resource requirements on the warfighter will be reduced. Figure 37 compares the time spent on fiscal management on organic supply functions in April 2001 with January 2002. In most cases, we do see a decrease in the amount of time spent on fiscal management. The decrease is largest among junior enlisted personnel, who reported that they spent 10 percent of their time on fiscal matters in the baseline, as compared to 6 percent of their time in the midterm surveys. This decrease translates into approximately 20 minutes less per 8 hour workday for each Marine.[11]

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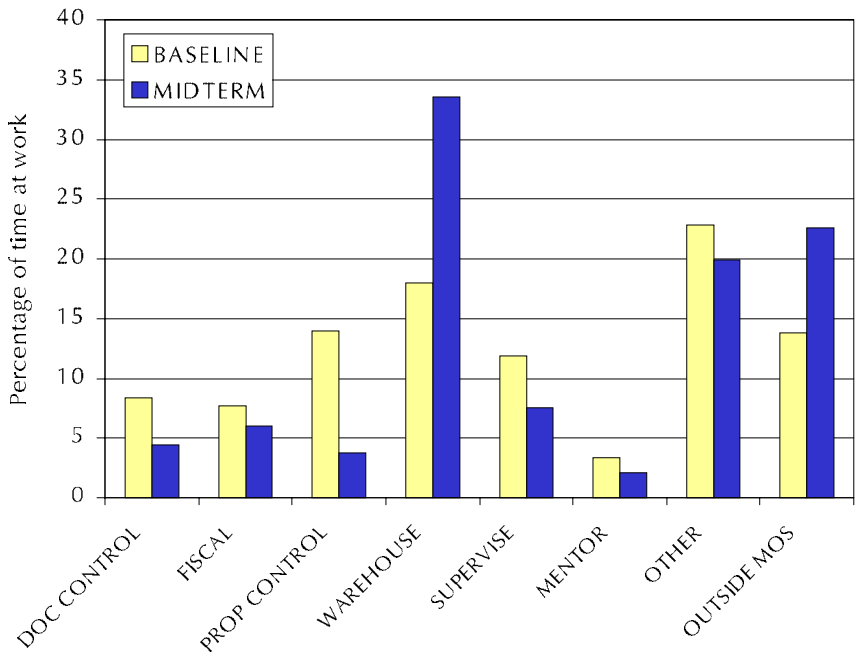
9. 2d FSSG reported 255 supply personnel on-hand (excluding Supply Battalion). (We exclude Supply Battalion in much of the baseline analysis that follows because our focus is on using units, and many of the Supply Battalion personnel are part of the ISSA.) If all 255 personnel had returned all 10 surveys, we would have collected 2550 surveys. Our baseline sample (excluding Supply Battalion) is approximately nine percent of all possible surveys. Again, it is not possible to determine from the responses exactly how many Marines are represented in the sample. Using the same kind of analysis, it is clear that we have a much larger sample size for the midterm surveys, since the number of surveys returned is so much larger, while the number of supply personnel has remained approximately the same.
10. The data presented here refers only to organic supply personnel. Personnel from the ISSA also completed surveys and that data will be presented separately.
11. Supply administration clerks (those with an MOS = 3043) reported slightly more time spent on fiscal management during the midterm. However, the difference is so small that it is not statistically significant.

Figure 36. Time allocation for supply personnel



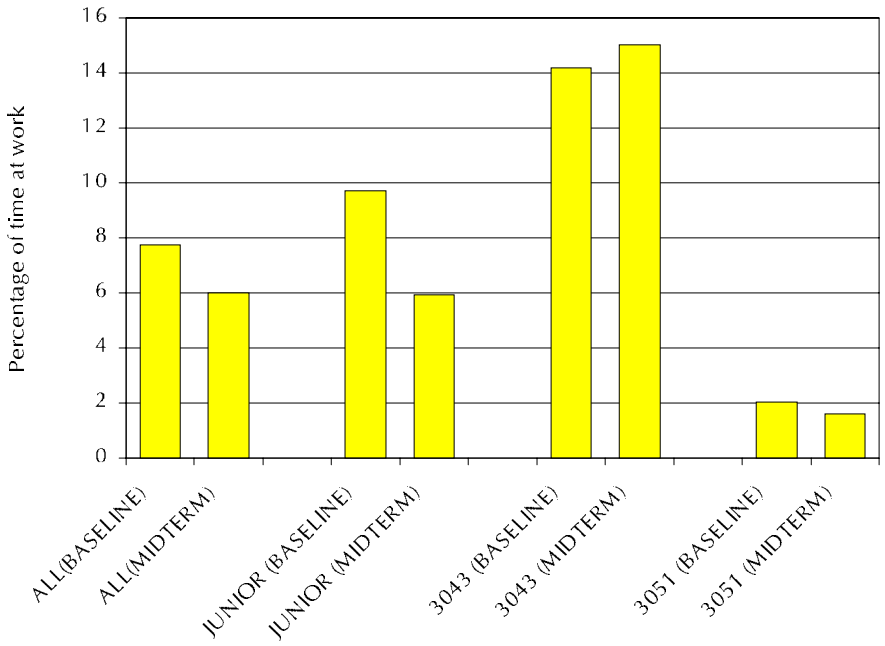
Hypothesis 2: Reduced redundancy

The second hypothesis states that the U/U will be relieved of redundancy and overlapping functionality, while uniting skill sets, thereby allowing the warfighter to focus on core competencies. To evaluate this hypothesis, we establish a baseline understanding of the time currently devoted to supply functions at the U/U level.

We define supply functions to include property control, document control, fiscal management, and warehouse activities. Figure 38 shows the data on time spent on supply activities, for all the surveys, junior enlisted (PVT through CPL) and the two primary MOSs (3043 (Supply Administration and Operation Clerk) and 3051 (Warehouse Clerk)).[12] In most cases, supply personnel spend approximately half their workday on these supply activities.

At this point in the POC, there has not been a substantial decrease in the amount of time spent by supply personnel on supply activities. Given that the consolidation of supply functions was implemented

Figure 37. Time spent by supply personnel on fiscal management



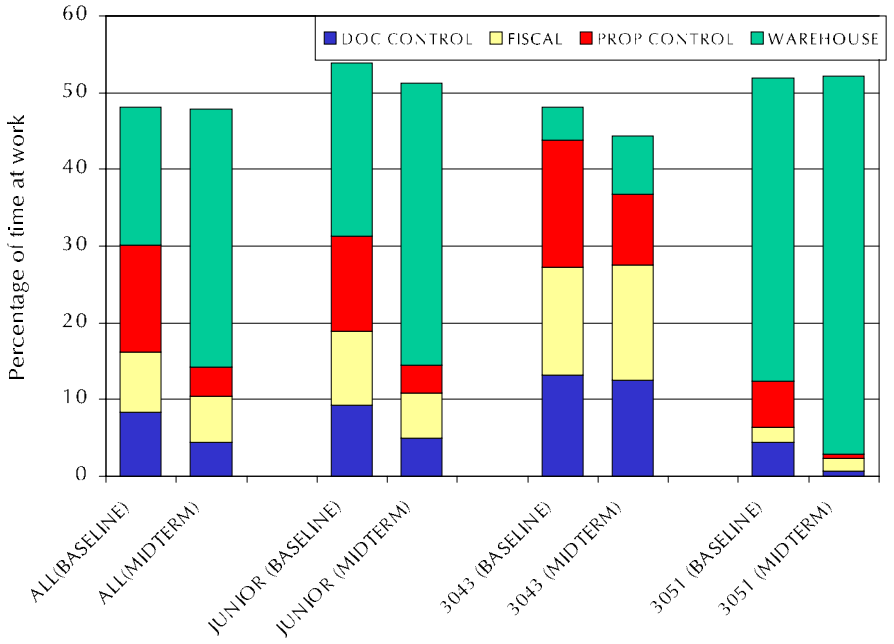
only slightly before the midterm surveys were administered, this result is not unexpected. When the final surveys are administered, we may see more of a change in the time spent on supply activities. Right now, the major change has been the movement of many of the battalion supply personnel to Supply Battalion, with the process changes to follow. When those process changes are implemented, we will be able to test whether the ILC concepts do indeed lower the amount of time supply personnel are required to spend on these administrative activities.

Hypothesis 3: Reduced inventory management

The next hypothesis relating to supply man hours states that supply consolidation will result in inventory consolidation and lead to a subse-

12. As with the maintenance surveys, we do not break the data down by battalion here, since with the creation of the Consolidated Supply Function sections within Supply Battalion, Supply Battalion accounts for almost 90 percent of the surveys.

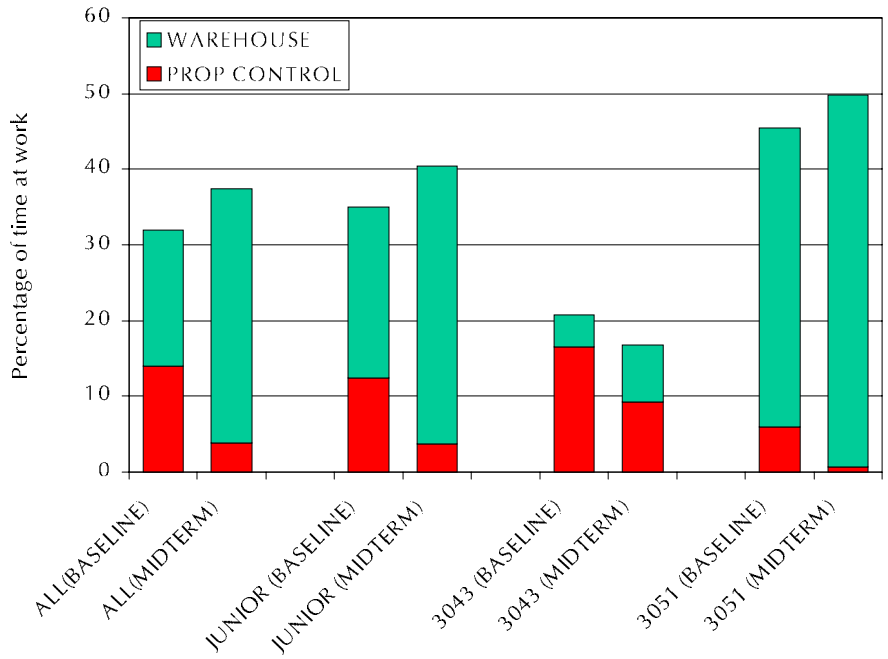
Figure 38. Time spent by supply personnel on supply activities



quent reduction in the resource requirements needed to manage these inventories. To evaluate this hypothesis, we focus on man hours devoted to managing the supply inventory. We examine two activities relating to inventory management: property control and warehousing. Figure 39 compares the time reported for the two sets of surveys for inventory management.

Overall, respondents indicated that the amount of time spent on inventory management increased approximately 5 percent (from 32 to 37 percent). (5 percent of an 8-hour workday is about 24 minutes.) Interestingly, the amount of time spent on warehousing activities increased substantially, while the amount of time spent on property control decreased substantially. This change could be due to differences in interpreting which activities fell into which category, or to changes in procedures when battalion supply personnel moved to Supply Battalion.

Figure 39. Time spent by supply personnel on inventory management

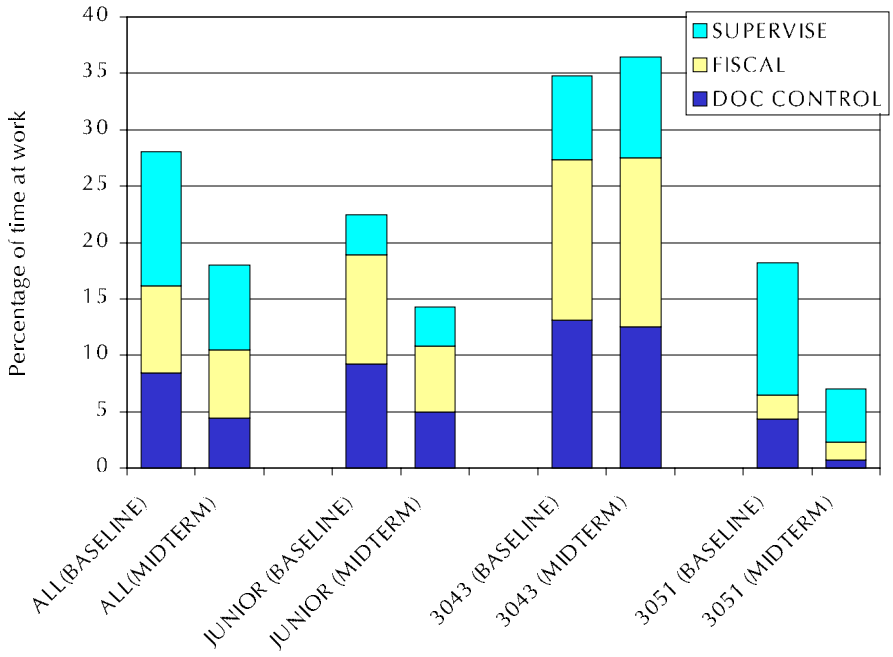


Hypothesis 4: Reduced administrative burden

The fourth hypothesis asserts that economies of scale will be gained as the overall administrative burden associated with monitoring inventories is lessened. We define administrative activities as the overhead activities associated with inventory management. Using this definition, we identify supervising, document control and fiscal management as parts of the inventory management overhead/ administrative burden. Figure 40 compares this administrative time across the two survey time periods.

When we compare the two sets of surveys, we see substantial decreases in the time spent on these administrative activities in almost all categories. Warehouse clerks (those with an MOS of 3051) reported particularly large decreases in time spent on document control (dropping from 4 to 1 percent) and time spent supervising (dropping from 12 to 5 percent). Overall, their administrative burden reported was reduced by almost an hour a day (based on an 8-hour workday). Junior enlisted also reported a substantial drop in time

Figure 40. Time spent by supply personnel on administrative activities



spent on these three activities - their overall time spent on administration dropped to 14 percent of their time at work, compared to 22 percent before the POC. (This is about a 40 minute time savings each day, per Marine.)

However, supply administration clerks (those with an MOS of 3043) are really the group of Marines who are responsible for many of these administrative tasks. We do not see any substantial change in the time these Marines spend on these tasks. Again, we will have to wait until the process changes are fully implemented to see whether there will be time changes for this group. Currently, 3043s spend approximately 36 percent of their time at work on these activities.

Perceptions of current maintenance and supply support

As stated earlier, we would also like to be able to provide some objective measure of the quality of the logistics systems. However, 'quality' is inherently a subjective issue. As an attempt to measure the 'quality' of logistics support, we surveyed 2d FSSG personnel about their satisfaction with maintenance and supply support in April 2001 and January/February 2002. Here we compare the results of these two sets of surveys. The baseline surveys were paper surveys, administered by FSMAO personnel to the units. For the midterm surveys, the forms were web-based on the FSMAO website.[13] This section includes satisfaction survey results for:

- Maintenance personnel
- Supply personnel
- Customers

Satisfaction survey results

To understand current attitudes about maintenance and supply support, we developed some simple surveys and administered them to maintenance, supply, and supervisory personnel. We gave the maintenance and supply satisfaction surveys to personnel in each functional area to ascertain current personnel perceptions of supply and maintenance shop activities.

13. There was a higher response rate for the midterm surveys than for the baseline surveys. The ease of filling out the survey—since personnel could do it at their convenience rather than at a set time—may have contributed to this higher response rate.

Maintenance

We gave maintenance satisfaction surveys to all 2nd and 3rd echelon maintenance personnel in the FSSG. We received a much larger response from maintenance personnel in comparison to the supply, as we would expect, given that the number of maintenance personnel in 2d FSSG is much greater than the number of supply personnel. We asked a series of five questions to establish the current perceptions of maintenance personnel with respect to supply and maintenance support activities. We analyzed the results from 591 maintenance surveys for the baseline and 836 surveys for the midterm. The baseline surveys represent approximately one-third to one-half of on-hand personnel in each battalion, while the midterm surveys represent about one-half of all maintenance personnel in 2d FSSG. Given the substantial sample of personnel participating in the survey, the survey results should reflect the general opinions of FSSG personnel. [14]

The five questions we asked were:

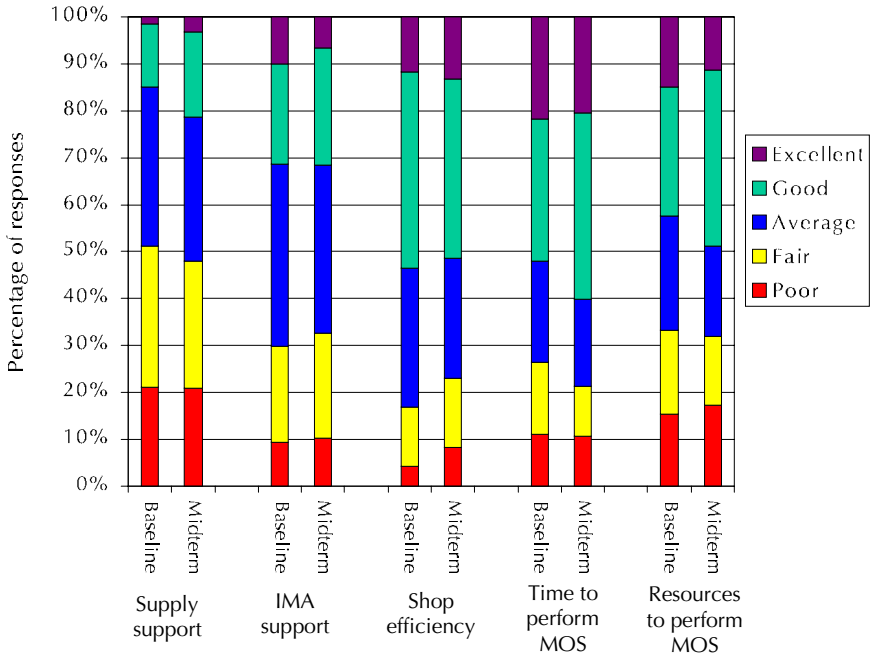
- What is your level of satisfaction with supply support?
- What is your level of satisfaction with intermediate maintenance activity (IMA) support?
- How satisfied are you with the efficiency of your shop?
- Do you have adequate time to perform your MOS?
- Do you have adequate resources to perform your MOS?

Possible responses were poor, fair, average, good and excellent. Figure 41 compares the responses to the baseline and midterm surveys.

The two sets of surveys show very similar patterns for their levels of satisfaction. Respondents were least satisfied with supply support (with about half rating that type of support as either poor or fair). The comments included on the midterm surveys also mirrored the same comments given on the baseline surveys. Again, among the most common were the following:

14. Details on the data are in appendix D.

Figure 41. Maintenance satisfaction survey results



- As with the supply satisfaction surveys, respondents often cited problems relating to the ATLASSII+ system as a source of slowdowns in the maintenance process. In particular, it was mentioned that the system is frequently down and when working it is often inaccurate with respect to the status of parts orders. Personnel also indicated that more ATLASSII+ stations were needed in some maintenance shops.
- Respondents also cited the need for better ATLASSII+ training to enable personnel to use the system more effectively.
- Respondents indicated delays in receiving orders through the supply system and inaccurately filled orders as issues relating to the supply system that had an impact on maintenance performance.
- Respondents also mentioned that the poor availability of appropriate tools and safety equipment in the maintenance shops hindered their work performance.

One additional comment that was often included on the midterm surveys, and was not present as much in the baseline surveys, was dissatisfaction with the length of the workday in recent months.

Supply

We gave the supply satisfaction surveys to all supply personnel within 2d FSSG and received 149 responses for the baseline and 202 responses for the midterm. These results represent between one-quarter and one-third of supply personnel.[15] The survey included four questions intended to measure the current level of satisfaction among supply personnel. The four questions were:

- What is your level of satisfaction with external/intermediate supply support?
- How satisfied are you with the efficiency of your shop?
- Do you have adequate time to perform your MOS?
- Do you have adequate resources to perform your MOS?

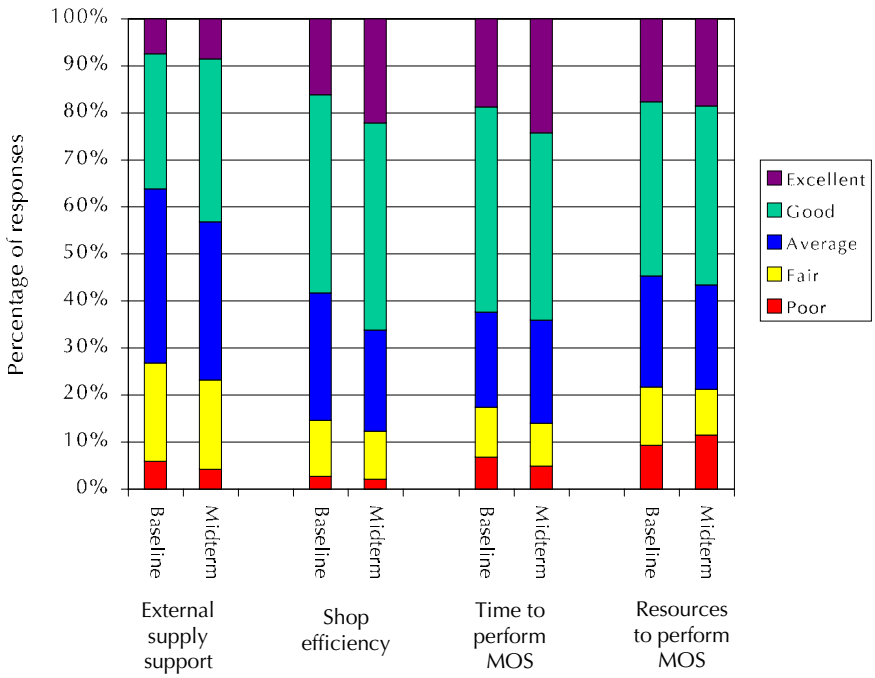
As with the maintenance surveys, the responses to the midterm surveys were very similar to those in the baseline. Figure 42 compares the results of the two sets of surveys.

As with the baseline surveys, respondents to the midterm surveys included comments on specific problems with the supply process. Some of the more common comments were as follows:

- Respondents mentioned the need for more training in the use of ATLASSII+ to enable supply personnel to perform their jobs more effectively. They also mentioned that more and faster computers would increase the level of performance within the supply system.
- Respondents cited a number of issues relating to the ATLASSII+ system's functionality that impact the performance of the supply system. The most common issues were the amount of downtime for the ATLASSII+ system and the fact

15. Details on the data are in appendix D.

Figure 42. Supply satisfaction survey results



that ATLASSII+ does not always reflect the most up-to-date information on the current status of orders.

Given that the supply process was still in a transition phase at the time of the midterm surveys, we cannot know at this point how the implementation of the ILC concepts will affect supply personnel satisfaction. The final set of surveys should provide a better indication of the changes due to ILC.

Customers

We gave the customer satisfaction survey to supervisors in 2d FSSG's battalions to ascertain their perceptions of supply and maintenance support.[16] We had a slightly larger sample size for the midterm assessment, about 200 responses compared to about 150 for the baseline. We have responses from each battalion in 2d FSSG. It appears that customers are much less satisfied now than they were last May with maintenance and supply support. They provided many written comments explaining why they are dissatisfied. Some comments were

directly related to the changes that have occurred during the POC (whether ILC-related or not) and others were more general comments on the state of logistics support.

The five possible answers on the survey were poor, fair, average, good and excellent. Supervisors were asked to rate maintenance an supply support separately on the following criteria:

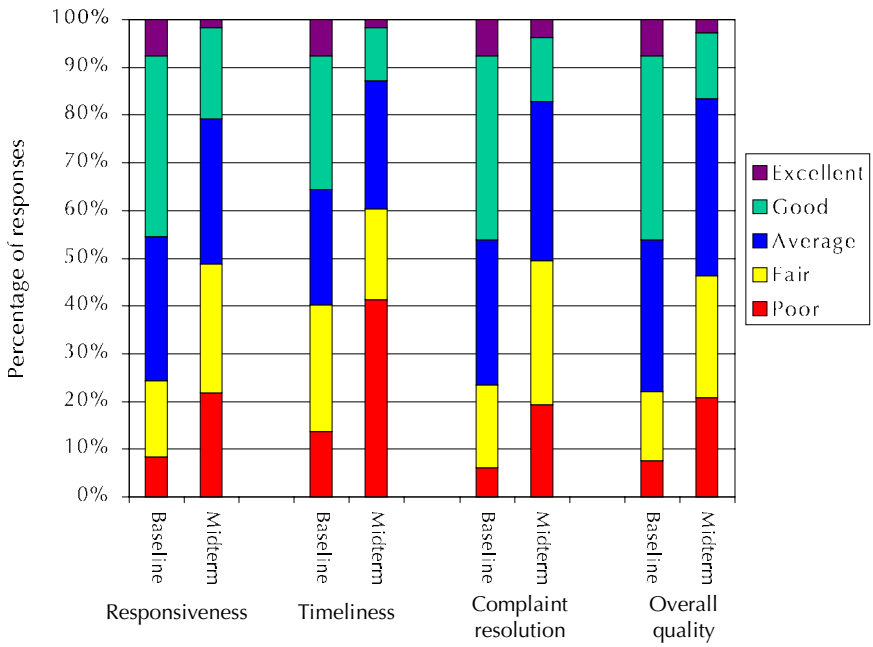
- Responsiveness to requirement
- Accuracy of orders
- Resolution of service complaints
- Overall quality of support

Figures 43 and 44 compare the results of the two surveys. Summarizing the results, we find:

- The percentage of respondents rating overall quality of maintenance support either poor or fair rose to 46%, compared to 22% in the baseline. At the same time, the percentage rating overall support either good or excellent dropped to 16% from 46%. All three elements of maintenance support that we asked about (responsiveness to requirements, timeliness of repair, and resolution of service complaints) showed similar increases in dissatisfaction.
- On the supply side, the percentage rating overall supply support either poor or fair rose to 34% from 12%. At the same time, the percentage rating overall support either good or excellent dropped to 33% from 55%. As with maintenance, all three separate elements of supply support (responsiveness to

16. The FSSG presents an interesting situation: they are both suppliers and customers of the maintenance and supply systems. It would have been useful to give this survey to supervisors in other parts of the MEF, who are customers of the logistics system but do not tend to function as suppliers. However, due to time constraints, we were not able to expand our surveys outside the FSSG. Further surveys are scheduled for other parts of the MEF during 2002.

Figure 43. Customer satisfaction survey - maintenance

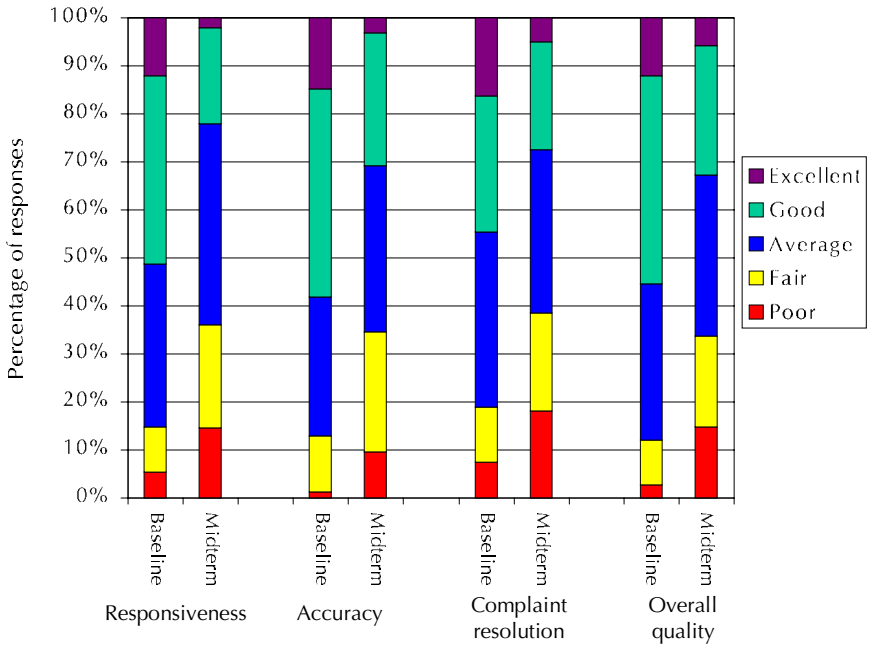


requirements, accuracy of orders and resolution of service complaints) saw similar increases in dissatisfaction.

Most of the written comments focused on maintenance, though there were some relating directly to supply issues. Some of the comments that were repeated regularly were the following:

- Two of the primary complaints about maintenance support are that the customer's equipment is in the maintenance cycle for too long a period of time, and the customer does not have the same visibility on the progress of repair of their equipment while it is at Maintenance Battalion as they did when personnel at their battalion were performing the repairs.
- A second issue is the coordination between the unit and the maintenance contact team. Many respondents stated that contact teams take far too long to arrive and often do not perform the repairs correctly when they do arrive. For fairly minor repairs, the respondents mentioned repeatedly that they would prefer a line mechanic at the unit who could take care of these

Figure 44. Customer satisfaction survey - supply



issues on the spot, rather than waiting for the contact team to arrive. They also mentioned that this line mechanic could do some of the preliminary troubleshooting for more major issues to help speed the process for the contact team.

- The two comments most often cited on the supply side were the lack of the ability to track orders through the system and the many steps involved in the ordering process itself.

Appendix A: Acronyms

ATLASSII+	Asset Tracking Logistics and Supply System II+
Bn	Battalion
CSF	Consolidation of Supply Functions
CWT	Customer Wait Time
EOM	Echelon of Maintenance
ESB	Engineer Support Battalion
FSMAO	Field Supply Maintenance Analysis Office
FSSG	Force Service Support Group
HAZMAT	Hazardous Materiel
HQSVC	Headquarters and Service
II MEF	2nd Marine Expeditionary Force
ILC	Integrated Logistics Capability
IMA	Intermediate Maintenance Activity
IMPAC	International Merchant Purchase Authorization Card
IPT	Integrated Process Team
ISSA	Intermediate Supply Support Activity
ITS	Individual Training Standards
LTI	Limited Technical Inspection
LVS	Logistics Vehicle System
LX	Logistics Study and Analysis
MATCOM	Materiel Command
MCREM	Marine Corps Readiness Equipment Module
MMO	Maintenance Management Officer
MOS	Military Occupational Specialty
MOS	Maintenance Operations Section
PEB	Pre-expended Bin
PM	Preventive Maintenance
POC	Proof of Concept
QC	Quality Control
RCT	Repair Cycle Time
SECREP	Secondary Reparable
SRT	Supply Response Time

STRATIS	Storage Retrieval Automated Tracking Integrated System
T/O	Table of Organization, manpower requirements
TAMCN	Table of Authorized Materiel Control Number
TSB	Transportation Support Battalion
UMF	Unit Materiel File
WON	Work Order Number

Appendix B: Performance Measures for 2d FSSG Proof of Concept Hypotheses

The 2nd FSSG Proof of Concept Plan includes several hypotheses regarding the desired effects of implementing two ILC initiatives: 2nd echelon of maintenance migration and consolidation of supply functions at the intermediate level. Below, we list one or more performance measures for each of the hypotheses, with a data source for each measure. Many of the performance measures relate to multiple hypotheses. These measures, along with additional information about data collectors and frequency of reporting, can all be found in the data collection plan included as an appendix to the Proof of Concept Plan.

EOM Hypotheses

If the FSSG Battalions' organic maintenance functions are migrated to the intermediate maintenance level then:

- Intermediate maintenance level personnel will have the responsibility to conduct both 2d and 3d EOM thus streamlining the overall maintenance effort.
  - Measure: Customer Wait Time (CWT)
    - Data source: ATLASSII+
  - Measure: Repair Cycle Time (RCT)
    - Data source: ATLASSII+
  - Measure: Number of personnel
    - Data source: Unit surveys; T/O
  - Measure: Number/type of steps in maintenance process
    - Data source: Process observation/interviews

- Training of junior maintenance personnel will broaden/improve, as they will have more direct access to mechanics/technicians with experience in 3d EOM repairs.
  - — Measure: Proficiency of maintenance personnel in performing their MOS
    - – Data source: Before/after training surveys of maintenance personnel
  - — Measure: Amount of mentoring received by junior Marines
    - – Data source: Survey data
  - — Measure: Ratio of SNCO/junior Marines in maintenance shop
    - – Data source: Unit survey; T/O
- Support will become more responsive to the customer as there will be fewer non-value added steps and thus a direct link to the intermediate level of maintenance.
  - — Measure: Materiel readiness rates
    - – Data source: MCREM
  - — Measure: CWT
    - – Data source: ATLASSII+
  - — Measure: RCT
    - – Data source: ATLASSII+
  - — Measure: Number/type of steps in maintenance process
    - – Data source: Process observation/interviews
- Tools will be consolidated thus reducing resource requirements
  - — Measure: Number of toolkits/sets/chests
    - – Data source: Unit surveys; unit materiel file
  - — Measure: Number of personnel managing tools
    - – Data source: Unit surveys

- Maintenance support will become more responsive to the customer because there will be decreased administrative burden for the using unit and satellite maintenance sites will focus on corrective maintenance.
  - — Measure: Materiel readiness rates
    - – Data source: MCREM
  - — Measure: Ratio of overhead/maintenance personnel
    - – Data source: Unit surveys
- Labor productivity will increase, as maintenance sites will have a more streamlined approach due to the elimination of the EOM's and a focus/redefinition of intermediate maintenance.
  - — Measure: Materiel readiness rates
    - – Data source: MCREM
  - — Measure: Ratio of hours spent on maintenance/hours spent on other activities (including admin)
    - – Data source: Surveys
  - — Measure: Hours per task
    - – Data source: Surveys
- Facilities will be consolidated thus reducing resource requirements.
  - — Measure: Square footage (covered and uncovered) of maintenance facilities
    - – Data source: Unit surveys
  - — Measure: Number of HAZMAT sites
    - – Data source: Unit surveys
- Economies of scale will be gained as the overall administrative burden associated with monitoring parts (PEB), layettes, maintenance records and the like will be lessened.

  - — Measure: Number of personnel performing overhead duties
    - – Data source: Unit surveys
- Labor economies of scale will be gained through the consolidation of mechanics and technicians.
  - — Measure: Hours per task
    - – Data source: Surveys
  - — Measure: Number/type of steps in maintenance process
    - – Data source: Process observation/interviews

CSF Hypotheses

If selected organic supply functions are migrated to the intermediate level then:

- Intermediate level supply personnel will have the responsibility to conduct selected organic supply functions thus streamlining the overall supply chain management effort thereby reducing the burden on the war fighter.
  - — Measure: CWT
    - – Data source: ATLASSII+
  - — Measure: Time spent on supply functions by non-supply personnel
    - – Data source: Surveys
- Supply support will become more responsive to the war fighter as there will be a direct link (single point) to the intermediate level.
  - — Measure: CWT
    - – Data source: ATLASSII+
- Inventory will be consolidated and reduced thus reducing resource requirements.

- Measure: Inventory value
  - Data source: Unit records (FSMAO should hold info); ATLASSII+
- Measure: Number of personnel managing inventory
  - Data source: Surveys

- Supply facilities may be consolidated thus reducing resource requirements.
  - Measure: Number of supply facilities
    - Data source: Surveys

- Economies of scale will be gained, as the overall administrative burden associated with monitoring inventories will be lessened.
  - Measure: Number of personnel managing inventory
    - Data source: Surveys
  - Measure: Time spent managing inventory
    - Data source: Surveys

- Labor economies of scale will be gained through the consolidation of supply personnel
  - Measure: Number of supply personnel
    - Data source: Unit surveys; T/O
  - Measure: Number of supply locations
    - Data source: Warehouse Locator File

- The using unit will be relieved of redundancy and overlapping functionality, while uniting skill sets, thereby allowing the warfighter to focus on core competency.
  - Measure: Number of non-supply personnel at the using unit performing supply functions
    - Data source: Surveys

- — Measure: Time spent by non-supply personnel at the using unit performing supply functions
  - – Data source: Surveys
- Fiscal responsibilities will be consolidated, reducing fiscal burdens and resource requirements on the warfighter.
  - — Measure: Number of personnel performing fiscal functions at the using unit
    - – Data source: Surveys
  - — Measure: Time spent performing fiscal functions at the using unit

Data source: Surveys

Appendix C: Timeline of events at 2d FSSG

The following is a timeline of some of the major events occuring at 2d FSSG during the time of the POC. Some of these events are related to the ILC POC, but others are a part of CSS migration or other issues. When we look at the trends in the data during this time period, it is not possible to say whether these trends are due soely to the implementation of ILC concepts or to a combination of effects among all the various programs that were underway at the time. The timeline below shows how many interrelated events occurred during this time period.

- Dec 99: Reparable Issue Point (RIP) Migration from 2d Supply Bn to 2d Maint Bn
- Apr 01: 2d FSSG ILC POC Metrics Baseline commences
- Apr 01: 2d Med Bn Engineer Migration to 8th ESB
- Apr 01: 2d TSB/8th ESB Selected Engineer Migration (less maint)
- April/May 01: ILC CNA/FSMAO-1 Baseline Assessment of 2d FSSG
- May 01: ATLASS II+ Supply & Maintenance Gap/Enhancement List Provided to HQMC
- June 01: Experimental T/O Review/Data Entry at MCCDC TFS Quantico
- 25 June 01: 2d MaintBn submission of policy letters to G-3
- 28 June 01: Effective date for MT Maint MOS personnel reassignments to 2d MaintBn
- Aug 01: 2d FSSG Garrison CSSOC Becomes Activated
- June-July 01: Med/Heavy MT Migration within 2d FSSG

- June-Aug 01: FS/Field Mess MOS/OPS & Material Management Consolidation Period
- TSB > H&SBN
- ESB > H&SBN
- June-Sept 01: NBC OPS/MOS & Material Mgmt Consolidation Period
- June/Oct 01: SUL training for 2d FSSG personnel
- 9 July 01: 2d FSSG commences ILC EOM consolidation POC. Naval message released.
- July 01: Motor Transport & Engineer Maintenance Migration to intermediate level @ 2d Maint Bn
- 17 July 01: Publication of 2d FSSG ILC POC Implementation Bulletin.
- 2 Aug 01: CG, 2d FSSG submits request for process improvement to PMCS for MotorTransport Equipment to DCMC, I&L
- 9 August 01: 2d FSSG Food Service Company activation. Food service function consolidates.
- Week of 13 August 01: Comm/Elect maintenance migration to intermediate level at 2d MaintBn
- August 01: New Battalion & Group level IMA Performance Charts/Metrics introduced
- 27 August-21 September 01: Testing of ATLASS II+ version .25 at SPAWAR, Chesapeake, VA. (Six II MEF Marines participating on-site)
- Sept 01: 2d FSSG barracks realignment & personnel shifts
- 17 Sept 01: DCMC, I&L forwards recommending approval CG, 2d FSSG request for process improvement to PMCS for Motor Transport Equipment to COMMARCORSYSCOM for action
- Oct 01: Release of ATLASS II+ Version .25 software update to II MEF

- 1 Oct 01: TFS published 2d FSSG Experimental T/O
- 4 Oct 01: COMMARCORSYSCOM approves CG, 2d FSSG request for process improvement of PMCS for Motor Transport equipment
- Oct 01: 2d FSSG ILC POC Baseline Assessment published by CNA
- Oct 01: Commence PilotTest
  - MPBN Activates
  - Organic supply support/administration provided by 2d SupBn
  - Maintenance support provided by 2d Maint Bn
  - More robust/functional FSSG CSSOC
- 20 Oct 01: 2d SupBn established CSF ILC POC documentation web site
- Nov 01: 2d SupplyBn organic supply function migrations to CSF
- 15 Nov 01: 2d FSSG CSF Implementation LOI published
- 19 Nov 01: ATLASS II+ Deployability meeting at II MEF with MARCORSYSCOM
- 19 Nov 01: 2d FSSG Phase I review of Experimantal Tables of Equipment. Initial identification of migrated items.
- Dec 01: H&S Bn and 8th ESB organic supply function migration to 2d FSSG CSF
- Dec 01: CSF master activity code (AC) MML140 activated for centralized administration and control of general supply material, e.g., tents, set, kits, chests normally stored in organic supply warehouses).
- 11 Jan 02: Commander, 2d FSSG signs correspondence to provide COMMARCORMATCOM recommended combat capabilities on SECREP maintenance

- 17 Jan 02: 2d FSSG Phase II review of experimental tables of equipment. Identification of additional item migrations.
- Jan/Feb 02: MCB CLNC Facilities Maintenance Department modifies 2d FSSG armory to accommodate 2d FSSG ILC Ordnance Maintenance Migration POC
- Jan/Feb 02: 2d FSSG ILC POC Ordnance maintenance migration period
- Feb 02: CSF migration for 2d TSB and 2d MaintBn
- Feb 02: CSF migration for 2d TSB & 2d MaintBn
- 12 Mar 02: Submitted formal correspondence to HQMC I&L (LPC-1) as request for waiver of assignment of motor transport mechanics to attend Wrecker/Recovery Operators school
- Mar/Apr 02: MCB CLNC Facilities Maintenance Department modifies 2d FSSG armory to accommodate 2d FSSG ILC Ordnance Maintenance Migration POC

Appendix D: Descriptive statistics for survey data

Man-hours per function surveys for maintenance and supply personnel

We administered surveys to all maintenance and supply personnel in 2d FSSG to develop an understanding of the current breakdown of activities occupying their time. We asked personnel to fill out time sheets for 10 days excluding weekends and holidays. We asked maintenance personnel to indicate how much time they spent each day on the following activities:

- accepting inspections, troubleshooting, ordering parts, repairs, quality control, administration, supervising, outside their MOS, mentoring and other.

We asked supply personnel to indicate the amount of time devoted each day to the following activities:

- property management, document control, fiscal management, warehouse, outside their MOS, supervising, mentoring, and other.

Figures 45-48 show samples of the maintenance and supply time sheets used for the baseline surveys. These surveys were changed into a machine-readable format for the midterm surveys.

For the baseline, we received approximately 1700 time sheets back. We excluded time sheets that had been filled out at the start or end of a period of leave and those that were filled out incompletely or incorrectly. After exclusions, we had sample sizes of 260 and 1116 time sheets for supply and maintenance, respectively.

For the midterm, we have larger sample sizes for both maintenance (2658 surveys) and supply (1186) personnel. The machine-readable format, as well as commanders' support, may have increased the response to the midterm survey.

While it is not possible to determine exactly how many Marines filled out surveys, since each Marine could have returned between one and ten surveys, we can make a rough estimate of sample size. For example, for the baseline, 2d FSSG reported 1928 maintenance personnel on-hand in June 2001. If all 1928 personnel had returned all 10 surveys, we would have collected 19,280 surveys. It is not possible to determine from the responses how many Marines are represented in our sample of 1116 surveys, since this sample could include 1 survey from each of 1116 Marines (58 percent of personnel), or 10 surveys from 111 Marines (6 percent of personnel). The actual sample lies between these two extremes.

On the supply side, at the time of the baseline surveys (June 2001) 2d FSSG reported 255 supply personnel on-hand (excluding Supply Battalion). We excluded Supply Battalion in much of the baseline analysis because our focus is on using units, and the majority of Supply Battalion personnel were a part of the ISSA at that time. After excluding surveys from Supply Battalion personnel, we have a baseline sample of 228 surveys. If all 255 personnel had returned all 10 surveys, we would have collected 2550 surveys. Our baseline sample is approximately nine percent of all possible surveys. Again, it is not possible to determine from the responses how many Marines are represented in the sample.

In both cases, our sample size for the midterm surveys is substantially larger than the baseline sample size. Using the same kind of reasoning, we have a sample size of at least 16 percent of maintenance personnel and 19 percent of supply personnel.[1]

1. In the midterm surveys, we did include personnel in H&S Company and in the Consolidated Supply Functions sections of Supply Battalion. We excluded personnel in the ISSA.

Figure 45. Maintenance man-hours per function survey form

Maintenance Man-hours per function Survey

Unit _____ Rank _____ Date _____

MOS _____ Time in MOS (YRs/MOs) _____ Time outside MOS (YRs/MOs) _____

Current Billet _____ Experience in Billet (YRs/MOs) _____

Time	Accept Inspection	Trouble-Shooting	Order Parts	Repair (Indicate type at right)	QC	Admin.	Supervisory	Outside MOS	Mentoring	Other	Type of Repair
0500	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0530	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0600	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0630	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0700	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0730	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0800	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0830	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
0900	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1000	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1030	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1100	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1130	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1200	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1230	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1330	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1400	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1430	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1500	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1530	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1600	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1630	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1700	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1730	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1800	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Figure 46. Maintenance man-hours per function survey form

HEADER INFORMATION:

Unit: include Bn/Company/Section

Time in MOS: Time since graduation from MOS school spent on duties within your MOS
Do not include recruiting duty, drill instructor duty, etc.

Time outside MOS: Time since graduation from MOS school spent on duties such as:
recruiting, FAP, MSG, SACO/Career planner

Experience in billet:
Time spent either in your current billet or in previous billets where you performed similar functions

Date: Today's date

TIME INFORMATION:

Please check the blocks for the time you spend performing the duties listed at the top of the column.
If you perform two different activities during the same half hour, check all boxes that apply.

Examples of 'ADMIN' activities include:
- PEB Management
- Publication management
- Tool control
- Calibration control
- Modification control
- MOS training
- HAZMAT control
- Property control
- PM scheduling
- 1st Echelon PMs
- Etc.

Examples of 'SUPERVISORY' activities include:
- Shop adminisration
- Scheduling
- Reporting
- Supervising
- Etc.

Examples of 'Outside MOS' activities include:
- PT
- Armory
- Field Day
- Formation
- Etc.

Mentoring is defined as: time spent providing (or receiving) one-on-one guidance in the performance of your MOS

PLEASE TURN IN THIS FORM AT THE END OF THE DAY TO THE COLLECTION BOX.

THIS INFORMATION WILL NOT BE USED TO EVALUATE INDIVIDUAL PERFORMANCE. THIS INFORMATION IS VERY IMPORTANT IN HELPING US EVALUATE THE EFFECTS OF IMPLEMENTING INTEGRATED LOGISTICS CAPABILITY CONCEPTS.
THANK YOU FOR YOUR HELP.

Figure 47. Supply man-hours per function survey form

Supply Man-hours per function Survey

Unit _____ Rank _____ Date _____

MOS _____ Time in MOS (YRs/MOs) _____ Time outside MOS (YRs/MOs) _____

Current Billet _____ Experience in Billet (YRs/MOs) _____

Time	Property control	Document control	Fiscal mgmt	Warehouse	Outside MOS	Supervisory	Mentoring	Other
0500	☐	☐	☐	☐	☐	☐	☐	☐
0530	☐	☐	☐	☐	☐	☐	☐	☐
0600	☐	☐	☐	☐	☐	☐	☐	☐
0630	☐	☐	☐	☐	☐	☐	☐	☐
0700	☐	☐	☐	☐	☐	☐	☐	☐
0730	☐	☐	☐	☐	☐	☐	☐	☐
0800	☐	☐	☐	☐	☐	☐	☐	☐
0830	☐	☐	☐	☐	☐	☐	☐	☐
0900	☐	☐	☐	☐	☐	☐	☐	☐
1000	☐	☐	☐	☐	☐	☐	☐	☐
1030	☐	☐	☐	☐	☐	☐	☐	☐
1100	☐	☐	☐	☐	☐	☐	☐	☐
1130	☐	☐	☐	☐	☐	☐	☐	☐
1200	☐	☐	☐	☐	☐	☐	☐	☐
1230	☐	☐	☐	☐	☐	☐	☐	☐
1330	☐	☐	☐	☐	☐	☐	☐	☐
1400	☐	☐	☐	☐	☐	☐	☐	☐
1430	☐	☐	☐	☐	☐	☐	☐	☐
1500	☐	☐	☐	☐	☐	☐	☐	☐
1530	☐	☐	☐	☐	☐	☐	☐	☐
1600	☐	☐	☐	☐	☐	☐	☐	☐
1630	☐	☐	☐	☐	☐	☐	☐	☐
1700	☐	☐	☐	☐	☐	☐	☐	☐
1730	☐	☐	☐	☐	☐	☐	☐	☐
1800	☐	☐	☐	☐	☐	☐	☐	☐

Figure 48. Supply man-hours per function survey form

HEADER INFORMATION:

Unit: include Bn/Company/Section

Time in MOS: Time since graduation from MOS school spent on duties within your MOS
Do not include recruiting duty, drill instructor duty, etc.

Time outside MOS: Time since graduation from MOS school spent on duties such as:
recruiting, FAP, MSG, SACO/Career planner

Experience in billet:
Time spent either in your current billet or in previous billets where you performed similar functions

Date: Today's date

TIME INFORMATION:

Please check the blocks for the time you spend performing the duties listed at the top of the column.
If you perform two different activities during the same half hour, check all boxes that apply.

PROPERTY CONTROL activities include control of serialized small arms.
FISCAL MANAGEMENT activities include purchase card management.
WAREHOUSE activities include packaged rations and ammo.

Examples of 'SUPERVISORY' activities include:
- Shop adminisration
- Scheduling
- Reporting
- Supervising
- Etc.

Examples of 'OUTSIDE MOS' activities include:
- PT
- Armory
- Field Day
- Formation
- Etc.

Mentoring is defined as: time spent providing (or receiving) one-on-one guidance in the performance of your MOS

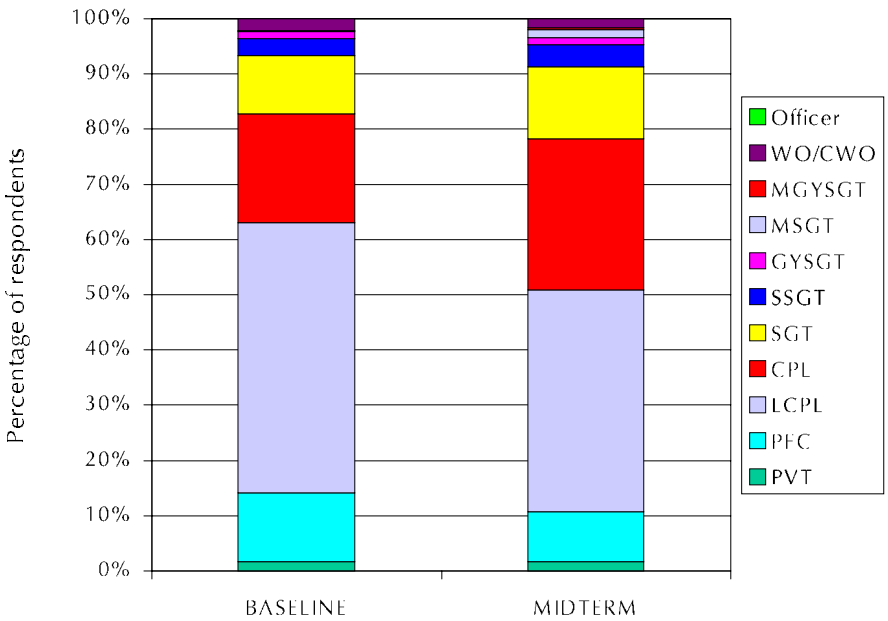
PLEASE TURN IN THIS FORM AT THE END OF THE DAY TO THE COLLECTION BOX.

THIS INFORMATION WILL NOT BE USED TO EVALUATE INDIVIDUAL PERFORMANCE. THIS INFORMATION IS VERY IMPORTANT IN HELPING US EVALUATE THE EFFECTS OF IMPLEMENTING INTEGRATED LOGISTICS CAPABILITY CONCEPTS.
THANK YOU FOR YOUR HELP.

Maintenance man-hours

Figure 49 provides a comparison of the surveys by rank. Figure 50 shows the same data separated by MOS. We do not separate the data by battalion as was done for the baseline, since 96 percent of the midterm surveys were from Maintenance Battalion personnel. While the composition of the two samples is not identical, they are similar enough to make reasonable comparisons between the two sets of surveys..

Figure 49. Respondents to maintenance time surveys, by rank



Supply man-hours

As with the maintenance surveys, figure 51 shows the respondents to the supply surveys by rank and figure 52 shows the respondents by MOS. As with the maintenance surveys, the two samples are not identical, but the composition is similar enough to permit comparisons between the two sets of surveys. .

Figure 50. Respondents to maintenance time surveys, by MOS

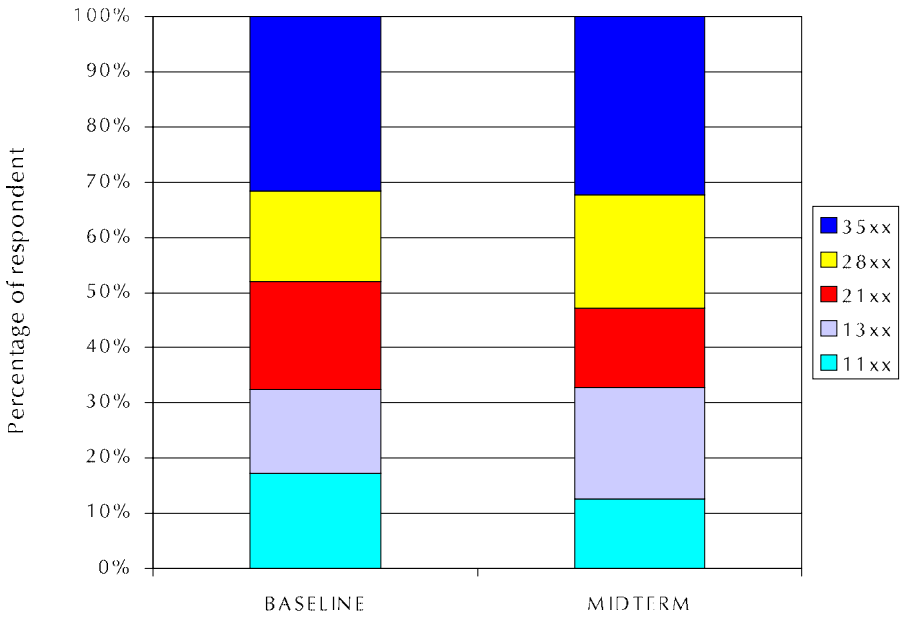


Figure 51. Respondents to supply time surveys, by rank

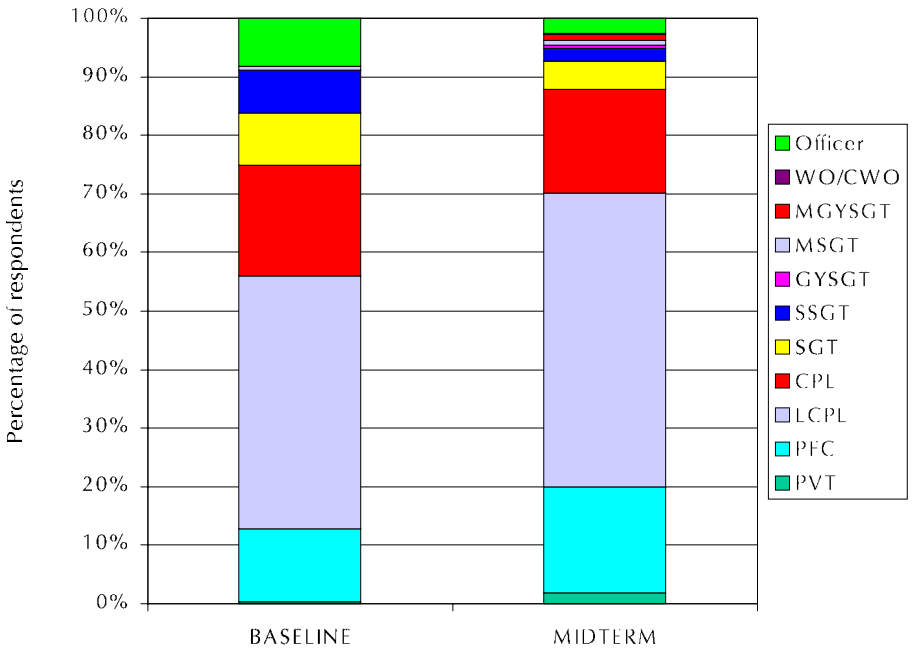
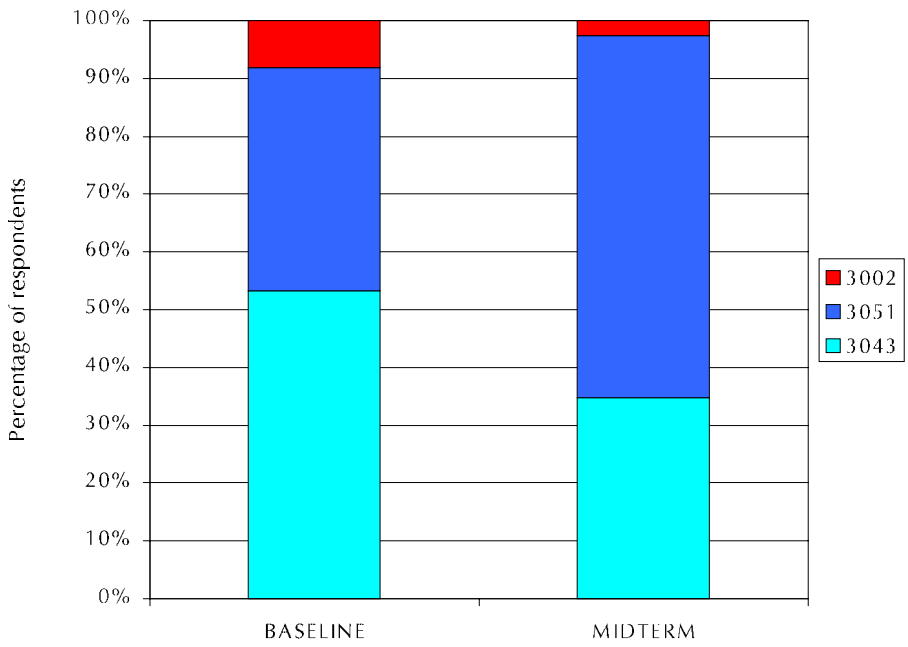


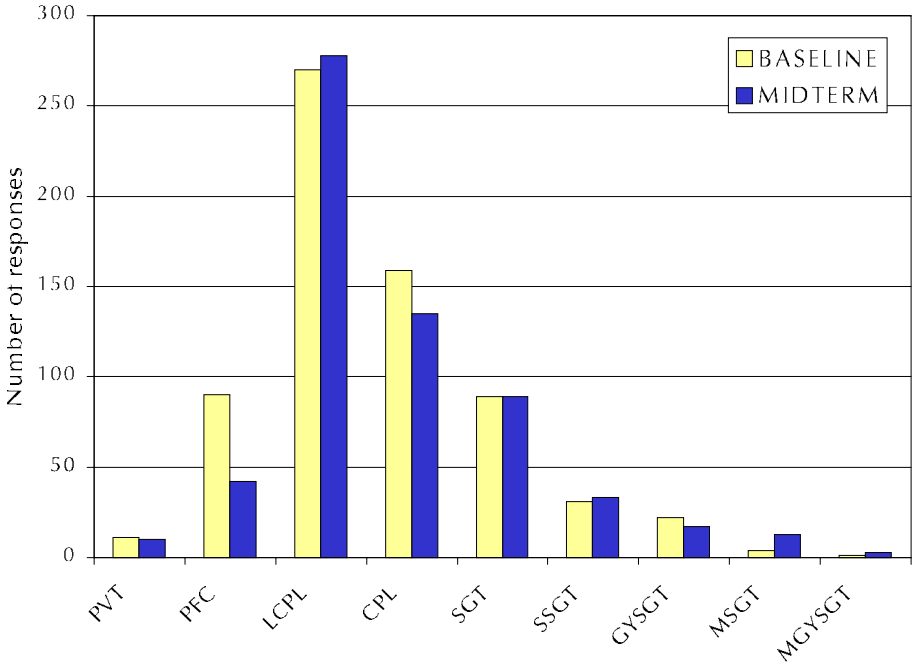
Figure 52. Respondents to supply time surveys, by MOS



Individual Training Standards (ITS) surveys of maintenance personnel

A total of 677 surveys representing 25 different Military Occupational Specialties (MOS) were completed for the baseline, and 622 surveys representing 27 MOSs were completed for the midterm. The vast majority of the midterm surveys were from Maintenance Battalion personnel, as we would expect given the reorganization of 2d FSSG during the POC. The distribution of surveys across ranks was comparable across the two sets of surveys, as shown in figure 53. In both sets of surveys, the majority of respondents were Lance Corporals. The distribution of surveys across MOSs was also similar. In both sets of surveys, about one-third of responses were from 3521s (Organizational Automotive Mechanic).

Figure 53. Respondents to the ITS surveys, by rank



Satisfaction survey summary data

Figures 54, 55, and 56 show the sources of the respondents to the satisfaction surveys. In each case, we received more surveys at the midterm of the POC than we did for the baseline. For maintenance, the number of surveys jumped from 591 to 836; for supply, from 149 to 202; and for customers, from 147 to 218. This is a total of 1256 surveys - a majority of on-hand maintenance and supply personnel in 2d FSSG.

Figure 54. Maintenance satisfaction survey responses, by battalion

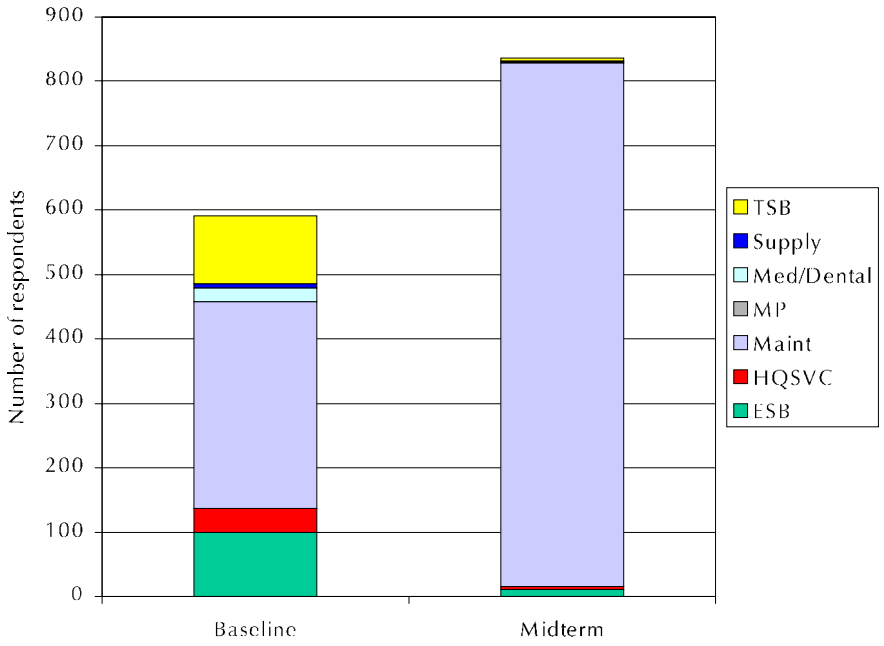


Figure 55. Supply satisfaction survey respondents, by battalion

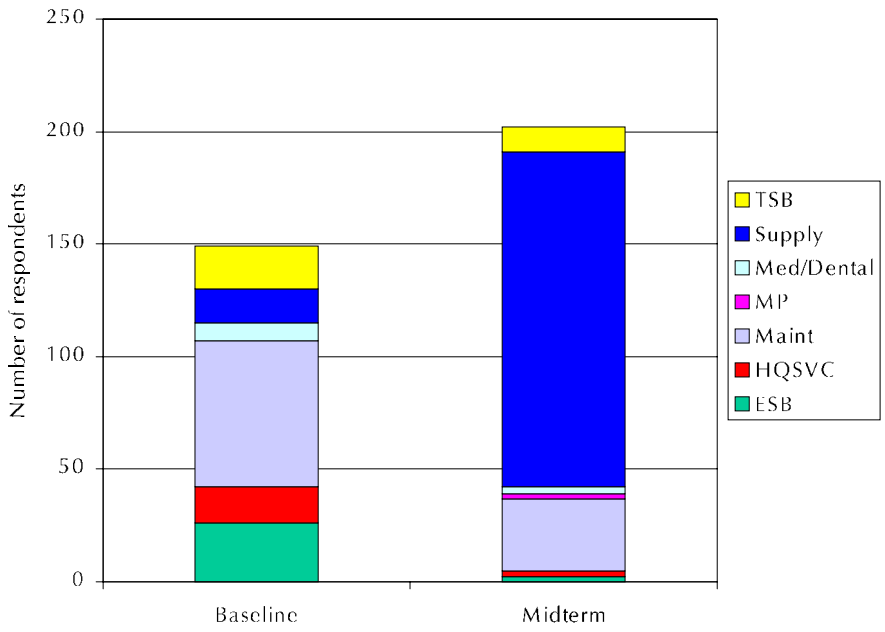
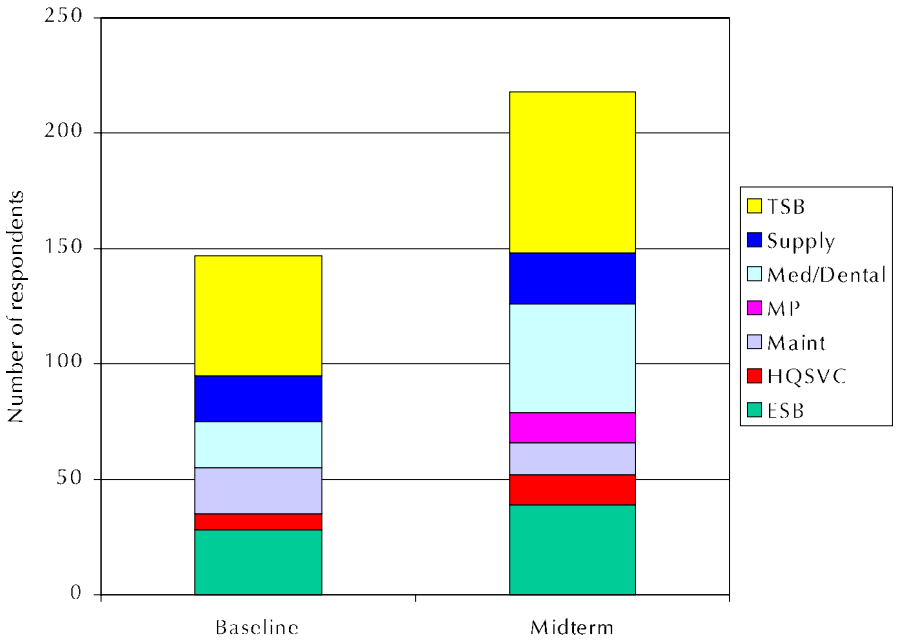


Figure 56. Customer satisfaction survey respondents, by battalion



References

[1] Berta Heybey, et al. *USMC Integrated Logistics Capability Proof of Concept Baseline Assessment*, October 2001 (CNA Research Memorandum D0004083.A2)

[2] Berta Heybey, *USMC ILC Proof of Concept Quick Look Assessment,* February 2002 (CNA Annotated Briefing D0005769.A1)

List of figures